THE EFFECTS OF VARYING RACIAL COMPOSITIONS UPON ATTITUDES AND BEHAVIORS OF SUPERVISORS AND SUBORDINATES IN SIMULATED WORK GROUPS

by

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To all the people regardless of race, creed, or sex who have been denied jobs or better jobs because of discriminatory employment practices.

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Abstract of Dissertation Presented to the Graduate Council of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

THE EFFECTS OF VARYING RACIAL COMPOSITIONS UPON ATTITUDES AND BEHAVIORS OF SUPERVISORS AND SUBORDINATES IN SIMULATED WORK GROUPS

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Chairman: Dr. Walter A. Hill
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The purpose of this study was to investigate in a simulated job setting differences in attitudes and interaction behavior between (a) black and white supervisors, (b) black and white subordinates, (c) black, white, and racially mixed dyads of subordinates, and (d) black and white supervised dyads of black, white, and racially mixed subordinates.

A sample of 96 male undergraduate students, 48 black and 48 white, were hired for the study. Each of the 12 black and 12 white older students who opted to be supervisors were randomly assigned to supervise three different racially mixed dyads of subordinates (one all-black, one all-white, and one with a black and a white subordinate). The remaining 72 students, 36 black and 36 white, were randomly assigned to 1 of the 3 subordinate dyads that participated once with a black supervisor and once with a white supervisor. All possible orders of supervisor and dyad combinations were represented twice to reduce the effect of order bias. Each group of a supervisor and a subordinate dyad was given three similar problem-solving tasks, two structured and one unstructured.

During the task performance, two trained graduate students (one black and one white) observed and coded the group interaction through a one-way mirror. Output measures were: (1) the Bales' Interaction Process Analysis (IPA), (2) the duration of speech for each group member, (3) productivity of the three tasks, (4) cohesiveness, (5) self-esteem, and (6) satisfaction ratings (JDI) of fellow subordinates, supervisor, and work in the tasks.

Among the findings were the following major conclusions.

1. The only significant differences between black and white subordinates originated within the heterogeneous (racially mixed) dyads. As compared to white subordinates, black subordinates exhibited:

   a. Less giving of suggestion

   b. Less giving of information

c. Less giving of suggestions when with a white supervisor

d. Higher self-esteem

e. Less duration of speech

f. Greater satisfaction with work in the tasks.

In the aggregate comparison the black subordinate expressed greater satisfaction of his fellow white subordinate.

2. The individual differences that occurred between black and white subordinates in the heterogeneous dyads did not perceptibly affect the group behavior measures of productivity of the three tasks and of cohesiveness. There were no significant differences between subordinates of black and white homogeneous dyads and heterogeneous dyads in measures of interpersonal behavior (IPA), productivity of the three tasks, cohesiveness, self-esteem, duration of speech, and satisfaction with fellow subordinate, supervisor, and work in the tasks.

3. The only significant differences between black and white supervisors were that black supervisors exhibited less asking for opinion and suggestion over all subordinates.

4. In differences between supervised dyads, white dyads supervised by white supervisors exhibited more cohesiveness than black dyads supervised by white supervisors. No other significant differences in cohesiveness were found between any other supervised dyads. There were no other significant differences in group measures of productivity, duration of speech, and satisfaction with supervisor and work between the six different supervised dyads.

CHAPTER I

INTRODUCTION, LITERATURE SEARCH, AND HYPOTHESES

Introduction

Today black Americans are striving for many things. High on their priority list, if not at the top, are jobs. If they do not have jobs, most want them. If they have jobs, most want better jobs as well as the opportunity to prepare themselves for still better jobs in the future. However, prejudicial attitudes and discriminating practices in our nation have denied both jobs and better opportunities to many black Americans.

The psychological and social costs to the individual of this discrimination is very difficult to measure, but it has been estimated that the annual economic cost to our nation in wasted production and services approximates $17 billion (U.S. Department of Labor, 1963.) Walter Heller (1970) reported on studies by the Council of Economic Advisors that show:

> the nation losing between three and four percent of its Gross National Product annually through its failure to make full use of existing skills and knowledge of nonwhites, coupled with its failure to bring those skills and knowledge to a par with those of whites.[1]

Despite recent employment advances by some members of the black community, little improvement in black employment compared to white employment has occurred. The Manpower Report of the President (1972) reported almost one million jobless blacks in 1971. Their overall jobless rate of 8.2 in 1970 increased to 9.9 percent in 1971, while the teenage rate moved up from 29.1 to 31.7 percent. The overall Negro/white ratio of jobless rates is slightly less than 2 to 1 while the 31.7 percent jobless rate of

black teenagers was more than double the 15.1 percent rate for white teenagers.[2] This discouraging profile is also reflected in the scarcity of blacks in leadership positions. The Manpower Report of the President (1972) reported that, in 1970, blacks represented only 1.6 percent of male managers and officials in firms with 100 or more employees. Recently, the Black Caucus in Congress claimed that business, education, and governmental institutions have not integrated the Negro into all levels of their organizations.

In defense, these organizations state a great concern about the effectiveness of blacks as leaders -- particularly of integrated or all-white groups. If blacks are placed in leadership positions, they are usually limited to supervising other blacks. Unless significantly more blacks reach leadership positions at all levels in these organizations, the economic progress of other blacks may be stymied.

Statement of the Problem

Unfortunately, many qualified blacks are denied better jobs (or any job at all) because of the assumption by white employers that blacks are different from whites in a variety of work attitudes and behaviors. They further assume that these differences eventually reduce group effectiveness -- particularly in racially mixed work groups. Unfortunately, few empirical studies have examined these assumptions. We have only an early recognition by Ginzberg (1959) that race was one of the determinants of group effectiveness in the military. This lack of social psychological research concerning actual differences between blacks and whites and the nature of supervisor-subordinate interaction in job setting has been

decried by Triandis (1971), King & Bass (1970), Dreger & Miller (1968), and Moskos (1967).

Review of the Literature

Until recently, most social psychological research on interracial relationships has been concerned with the narrow study of verbal prejudice. In a review of the literature on race and ethnic relations, Harding, Proshansky, Kutner, & Chein (1969) found that approximately eight times as much space was devoted to studies of attitudes as compared with studies of overt behavior.

Attitude Studies

Recent literature reviews conducted by Katz (1970), Amir (1969), and Pettigrew (1969) generally agree with Allport's (1954) Contact Hypothesis regarding ethnic prejudice. This well-known hypothesis, implicitly assumed in many desegregation plans, states that intergroup contacts involving shared interests or goals, equal status of participants, and normative support tend to reduce prejudice. This hypothesis has received tentative support from studies in various environmental settings such as: the military (Stouffer, Suchman, DeVinney, Star & Williams, 1949); department stores (Harding & Hogrefe, 1952); housing projects (Deutsch & Collins, 1951; Wilner, Walkley & Cook, 1955); and experimental settings (Burnstein & McRae, 1962). These studies generally suggest that cooperative, equal status contact with Negroes may bring out favorable, but limited, change in attitudes among whites. This statement must be qualified, however, as a few studies have shown no change or no consistent change in attitudes among children experiencing interracial contacts in summer camps (Mussen, 1950;

Yarrow, 1958) or in elementary schools (Shaw, 1970: Carithers, 1970). Carithers (1970) concluded from his review of desegregated schools that interracial contact, per se, will not bring about increased tolerance or acceptance. In general, the equal status hypothesis has received impressive, although not completely consistent, support as a means of bringing about changes in white attitudes towards blacks.

One glaring omission in the above studies is their failure to deal with the effects of contact on black attitudes. In view of the apparent militancy of some blacks, we can no longer assume that black attitudes are fixed or favorable. Prejudicial attitudes are not confined to whites alone, but are now known to exist among members of both races. In addition to this omission, these studies have raised questions concerning the reliability of the relationship between an expressed attitude of prejudice and resulting overt behavior.

Relationship between attitude and behavior.-Katz (1970) reviewed the literature concerning the predictive power of verbal attitudes on overt behaviors such as: customer service (Kutner, Wilkins, & Yarrow, 1952; Saenger & Gilbert, 1950); GSR rating (Rankin & Campbell, 1955; Porier & Lott, 1967; Westie & DeFleur, 1959; Vidulich & Krevanick, 1966); verbal conditioning (Smith & Dixon, 1968); and willingness to pose with a Negro for a photograph (Linn, 1965; DeFleur & Westie, 1958). The field studies involving behaviors such as customer service show a discrepancy between verbal expression or intention and actual behavior. The four studies involving galvanic skin responses to Negro stimulus photographs show fairly consistently that prejudiced subjects give stronger autonomic reactions

than do relatively unprejudiced subjects. The implications of these studies remain uncertain and will require studies of a wider range of biracial situations (Katz, 1970).

The major findings of the studies asking whites to pose with a Negro for a photograph indicated that subjects high on anti-Negro prejudice were less willing than those low on anti-Negro prejudice to have their picture widely publicized. Linn (1965), using a somewhat questionable procedure, found no relationship between scores on anti-Negro prejudice scales and willingness to pose with Negro subjects when told that such photographs would be publicized widely. The implications of these studies are also ambiguous since one of the seven graded uses of the photographs could be considered a pro-Negro action. In addition, a refusal to pose with a Negro may not have been seen by the subjects as harmful to Negroes because subjects could assume that someone else would pose for the picture if they did not. In general, the above-cited studies do not show a consistent relationship between verbally expressed attitudes towards blacks and overt behavior towards blacks. One logical reason for the observed lack of consistency is that these studies missed the reality of most integration conditions by not placing the white subject in a position where he actually interacted with a Negro.

In a more recent study, Terry & Evans (1972) found that more class and race discrimination was attributed to other persons, especially to blacks, than to self and that class was a more important basis for discrimination than race.

Influencing attitudes.-Several studies have investigated the relationship of the sensitivity of attitudes towards minority groups to the individual influence of group members. Particular attention has been paid to the impact of the presence of a Negro peer or experimenter on the attitudes of high-prejudiced subjects. Several studies (Himmelstein & Moore, 1963; Bray, 1950, Berg, 1966, and Malof & Lott, 1962) indicated that behavior was not obviously consistent with the racial attitudes measured. The inconsistency between behaviors and attitudes may have been more apparent than real since the measured attitudes and observed behaviors had no perceived relationship to one another. No range of behavior alternatives existed. The choice was not between behaving consistently or inconsistently but only between engaging in specified types of behavior.

Behavior in Interaction Work Groups

Only a few studies have dealt with behavior in biracial work groups. These studies were concerned with communication by whites to Negro members (Burnstein & McRae, 1962; Katz, Goldston & Benjamin, 1958; Cohen 1969; Katz & Benjamin, 1960, Jaffee & Whitacre, 1969; Richards, 1970). Generally whites initiated more communicative acts, tended to talk more, and exercised more social influence than Negroes even though their success was controlled. Katz & Cohen (1962) and Katz & Benjamin (1960) found that the introduction of a shared goal (group bonus condition) did produce a greater amount of cooperative behavior, but did not affect the tendency of white subjects to avoid talking to Negroes on some tasks, or the tendency of Negro subjects to prefer talking to whites. Burnstein & McRae (1962) found that whites evaluated a Negro partner more favorably when groups received failure feedback than they did after success feedback.

Katz & Cohen (1962) found further a greater degree of role equality in the experimental condition, even though working toward a shared goal, seemed to negatively affect attitudes of white subjects. On a final questionnaire, these whites downgraded the problem solving ability of Negro partners even though both were correct an equal number of times on the task. The whites were also less willing to continue the working relationships than subjects in a control group.

Performance Ratings

Another area of difficulty in a working relationship is that attitudinal biases of white raters might result in lower performance evaluations of black supervisors. Cox & Krumboltz (1958) and DeJung & Kaplan (1962) showed that racial bias existed in peer ratings among military personnel. In both experiments, white and black soldiers received significantly higher performance ratings from members of their own race than from members of the other race.

The results above generally agree with the cooperative goal attainment hypothesis of Allport (1954). Deutsch & Collins (1951) and Sherif (1958) suggest that an approach is needed that takes full account of the cognitive predispositions that Negroes and whites bring to contact situations. This would include not only racial attitudes and stereotypes, but also assumptions about the motives of Negroes as well as whites in given racial encounters. A brief review of these and other black-white differences will aid our understanding of employment problems.

Racial Differences

General review.-Recent reviews of the literature by Dreger & Miller (1960; 1968) have summarized black-white differences on a number of

environmental, social, personality, perceptual, and heredity variables. They found that similarities continue to outweigh differences, but that significant differences do exist and that blacks and whites are far from having a clear understanding of the others' view of the world. Dreger & Miller (1968) further indicate that recent research is less apt to lump all blacks or all whites together such as the American Negro or the American white.

A few examples of the differences as reviewed by Dreger & Miller (1968) are:

1. Socioeconomic conditions affect both physical and psychological functioning, with higher status accorded light skin: lower socioeconomic status correlates with prenatal and perinatal experiences tending to induce neurological damage.

2. When genetic factors are considered, some specific abilities show up with differential racial patterns related to class and age of the children. In addition, the reciprocal nature of language and thought processes have revealed contrasts between concretistic thinking of lower socioeconomic groups, both white or black, and the more abstract processes of intellectual functioning of middle class children. Intellectual functioning has been the subject of a continuing heated debate, particularly over the issue of hereditary versus environmental influences. Bodmer & Cavalli-Sforza (1970) reviewed the work of Shockley, Jensen and others and concluded that the difference in I.Q. scores between blacks and whites cannot be attributed to genetics in the present circumstances.

3. Savoca (1965) correlated socioeconomic status with Originality (in terms of creative thinking) and Fluency. He also found that white children scored higher on Semantic Flexibility.

4. The presence or absence of the father in the home environment is a difference between black and white children. It, with preschool or no-preschool experience, is related to depressed I.Q. scores in the black group.

5. Negroes seem to continually express relatively high educational and occupational aspirations. Keig (1969) found that

many of these aspirations were not realistic with expectations from the environment.

6. A number of studies reveal comparatively negative self attitudes in Negroes (Katz et al., 1958; Deutsch, 1965). Gray (1964) found that the deprived Negro child, particularly, has a problem of identity and self-esteem.

These are but a few of the differences reviewed by Dreger and Miller (1968). In summary, they conclude that many variables (e.g., societal and cultural goals, socioeconomic status, caste status, child rearing practices, speech and communication complexities, levels of aspiration, examiner variables, measurement instrument variables, and immediate situational stimulation) must be analyzed multivariately to better understand the complexities of interaction of these variables on racial differences. Dreger and Miller also suggest that recent changes resulting from "the Second American Revolution" will have a significant effect on comparative psychological research.

Racial differences relevant to employment.-In view of our nation's pressing problems of employment integration, Triandis (1971) suggests the study of four main kinds of difference:

a) motivational such as self-esteem. Long, Ziller, Ramana & Reddy (1969) found self-esteem and socioeconomic status positively associated among teenage students in India. Katz & Benjamin (1960), Katz & Cohen (1962), Katz, Goldston & Benjamin (1958), Katz & Greenbaum (1963), and Lefcourt & Ladwig (1965) indicated that blacks tend to feel inadequate, and orient compliantly toward whites even when they are given objective evidence of equal mental or achievement ability.

b) use of time - such as socializing too much on the job. Kochman (1969) found a great deal of "rapping" occurring among ghetto members. This stereotype suggests that too much socializing occurs among blacks on the job (APA Symposium, 1969). Jaffee & Whitacre (1970) found that the number of votes received by a leader was positively related to high verbal interaction as measured by duration of speech, except for high black interaction.

c) interpersonal behavior - such as cohesiveness, affiliation, and suspicion. Guttentag (1970) reported greater group cohesiveness when members receive more individual attention and understanding from each other, communicate with one another, and feel attracted to one another. Blacks appear to be high on affiliation (Ferman, Kornbluk & Miller, 1968) which should result in greater cohesion and satisfaction scores. Huber (1970) found that supervisor-subordinate similarity was an important factor in determining the subordinate's job satisfaction, but it bore no relationship to performance evaluations. Katzell, Ewen, & Korman (1970) found that black employees, in a specific industry, were generally more satisfied with their jobs than white employees.

d) behavioral norms - such as taking the initiative. King & Bass (1970) indicate that black supervisors with white subordinates are more likely to exercise general rather than close supervision in order to encourage initiation of interaction by their subordinates.

Leadership studies.-Some recent writers (e.g., Blalock, 1967; Matthews 1969) have proposed a study of the differences between races in terms of the power resources available to each party and the readiness of each to employ these resources. Of particular importance is the power resource of leadership and its significance to the economic success of black individuals. King & Bass (1970) have examined the literature which indicates the relative absence of Negroes in leadership positions in the military, in business, in professional sport, etc., and have concluded that this absence amounts to an open indictment of the policies and prejudices of social institutions in this country. Further review of the literature confirms their concern. Despite general satisfaction with military integration from most quarters, the problem of rank and occupational status of Negroes serving in the Armed Forces is a major concern of Pentagon officials (Stillman, 1969). As of 1970, while 11 per cent of the American population was Negro, 10 per cent of the military was Negro but the officer corps consisted of only 2 per cent Negro (BLS,

1970). This distorted pyramid of Negro class structure with a very narrow vertex of people in leadership positions and a very broad base of less-skilled people is also a problem among noncommissioned officers (Stillman, 1969; Moskos, 1967).

In the business world the opportunities for black leadership are no better. The largest division of one of our nation's giant corporations in 1969 had only 17 black supervisors in its entire organization (King & Bass, 1970). Higher level black managers are virtually non-existent.

Unterman (1971) concluded that it is virtually impossible to find one successful minority management program in the entire nation. Faced with a lack of understanding of the social, psychological, and economic differences between blacks and whites, some companies have simply thrown in the towel and are doing little or nothing in the way of minority-group management programs (Unterman, 1971). The difficulties of black supervisors fitting into the white man's business world were highlighted in anecdotal form by Travaglio, Sloan & Walker (1971), Gooede (1970), and National Industrial Conference Board (1966). However, Campbell (1971) reported in a fifteen-city study of racial attitudes that 86 per cent of the whites questioned stated that they would not mind having a black supervisor on their job. Campbell (1971) suggested that the work situation apparently is not threatening to most whites because it involves the more public "distant" aspect of personality. Furthermore, King & Bass (1970) state that white supervisors are having trouble managing black subordinates in mixed and all-black work groups.

One of the major questions raised by racially mixing work groups is what will happen to the effectiveness of the group. This becomes an

especially debated dilemma when considerations are given to having blacks supervise whites. Specific attention needs to be given to questions such as: How do the individual, situational, and cultural differences of supervisors and subordinates influence the productivity and satisfaction of work groups? Do problems of interaction in racially mixed groups impede group effectiveness? What problems do superiors have when they supervise subordinates of a different race? Particularly, what problems do blacks have when they supervise racially mixed or all white subordinates. Unfortunately, few studies have examined these aspects of racially mixed groups.

Studies of blacks in leadership positions have generally been limited to such areas as temporary social settings (Winter, 1971; Fenelon, 1966); neighborhood opportunity centers (Delbecq & Kaplan, 1968); experimenter or test administrators (Katz, Roberts, & Robinson, 1965; Lefcourt & Ladwig, 1965; Battle & Rotter, 1963) and a business game (Richards, 1970). These studies generally show that in black-white interactions, the black has a higher expectancy of failure, shows less self-assertion, lower self-esteem, is more anxious and less efficient than when working among other blacks, talks to whites more than to other blacks, performs more poorly than whites on the situational exercises as a result of behavior of white subordinates, receives poorer performance ratings, and is influenced by evidence of equal ability with whites and behaves in an external control fashion when requiring skill but in an internal control manner when the attainment of rewards is perceived as a matter of chance. Blacks reveal a greater expectancy

of control as being external if they see their goals as being unobtainable through their own efforts. Winter (1971) is the only one who found an expression of confidence and aggressiveness among informal black male leaders. This occurred in self-analytic groups of college students.

The lack of adequate research concerning differences in black-white interactions in supervisor-subordinate relationships in job settings may result from the scarcity of black supervisors in the natural world. Particularly in the less industrialized sections of the South, black supervisors are a rarity, especially if they supervise whites. Even in the laboratory studies, the scarcity of blacks in universities--particularly in undergraduate psychology classes--has limited the research. Recently, Katz (1970) concluded that this scarcity of research concerning black-white interactions has seriously limited our knowledge.

Purpose of this Research Study

Based on the above literature review, it is obvious that little is known about differences between black and white supervisors and subordinates in actual job settings. The purpose of this study is to investigate differences between:

a) black and white supervisors and their relationships with black, white, and mixed racial groups of subordinates,

b) black and white subordinates and the nature of their interaction and attitudes in a simulated job setting, and

c) black, white, and racially mixed subordinate dyads supervised by black and white supervisors.

The laboratory setting of a simulated work group was chosen as the site to test for differences between blacks and whites. In the laboratory

there is the greater opportunity to control the independent variables of race and racial mixture and to assign subjects according to a systematic, unbiased plan.

Hypotheses

The specific null hypotheses tested are:

1. There are no differences between black and white supervisors in measures of:

   a) interpersonal behavior (IPA)
   b) style of leadership (IPA)
   c) duration of speech
   d) self-esteem
   e) satisfaction with subordinates
   f) satisfaction with work in the tasks

2. There are no differences between black and white subordinates in measures of:

   a) interpersonal behavior (IPA)
   b) duration of speech
   c) self-esteem
   d) satisfaction with their fellow subordinates
   e) satisfaction with their supervisor
   f) satisfaction with work in the tasks

3. There are no differences between dyads composed of black, white, and racially mixed subordinates in group performance measures of:

   a) interpersonal behavior (IPA)
   b) productivity of the three tasks
   c) cohesiveness
   d) self-esteem
   e) duration of speech
   f) satisfaction with their fellow subordinates
   g) satisfaction with their supervisors
   h) satisfaction with work in the tasks

4. There are no differences between black and white supervised dyads composed of black, white, and racially mixed subordinates in measures of:

a) productivity of the three tasks
b) cohesiveness
c) duration of speech
d) satisfaction with their supervisors
e) satisfaction with work in the tasks

In Chapter I we have shown that racial discrimination in employment can be a serious social and economic problem. The scarcity of black leaders in the military, business, and professional sports suggests that our nation's employment policies may be determined by assumptions relating to behavioral and attitudinal differences between blacks and whites in their delegated roles. It is often implied that these differences produce black-white interactions that impede group effectiveness. The absence of research in racial differences in work-roles prevents the determination of whether these assumptions are warranted or based on prejudicial emotions.

Chapter II establishes a methodological framework of a simulated work setting that manipulated the independent variables of race among supervisory and subordinate roles. Output variables of attitude and behavior measures are described in order to analyze the differences in black-white interaction in the group process.

Chapter III describes the results of the analyses and Chapter IV summarizes, concludes, and discusses possible reasons for the results jointly with some directional hypotheses suggested by research evidence, hunches, and stereotyped assumptions. Implications for future research also are stated.

Chapter I

Notes

[1]Heller (1970) makes a compelling case for national interest in eliminating discrimination by identifying groups that will benefit from greater economic quality for the Negro. For example, employers will have a larger and better prepared labor force; sellers will have a more affluent Negro community; taxpayers will have a diminishing welfare drain and a broader tax base to fund more productive government expenditure; and city property owners will benefit from decreasing crime, violence, and urban decay that accompany the economic gains of the Negro.

[2]Ever since the Korean War, the Negro/white ratio of jobless rates for teenagers (16-19 years of age) has steadily increased (i.e., 1.3 in 1954 to 2.1 in 1971). The jobless rate for black teenagers continued to increase during the high employment period for the Vietnam conflict (Manpower Report of the President, 1972, Table A-5).

CHAPTER II

METHODOLOGY

This chapter presents the methodology used in the study in terms of (a) subjects, (b) environment, (c) input variables, (d) mediating structure, (e) output variables, and (f) procedure.

Subjects

With a few exceptions, subjects were single male undergraduates from the University of Florida. The investigator tried to obtain a matched sample of white and black students of similar age, intellectual standing, and socioeconomic class. Lists of students of comparable senior placement scores and somewhat similar parental income were supplied by administrators of the Expanding Education Opportunity and Work Study Programs. The investigator recruited participants through the use of personal letters, phone calls, and counselor contacts. The study was introduced to the students by a cover story that identified the need for research into the way groups solve problems effectively. They were told they were chosen because college students are among the groups that have the ability and interest to participate in solving problems in business, in society, and in our nation.

Students were asked to complete a biographical questionnaire prior to scheduling their participation in the study (see Appendix A). The

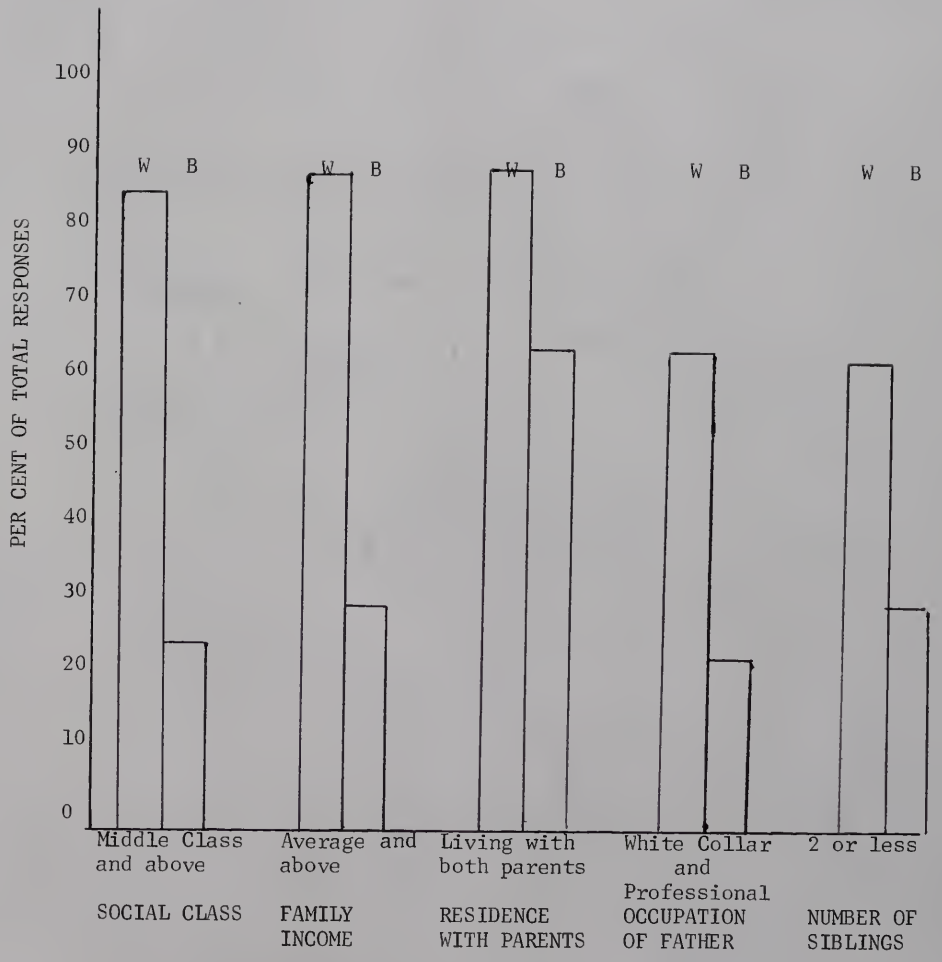


Figure I
Selected Comparisons in Reported Economic and Social

Characteristics of Black and White Participants

purposes of the biographical questionnaire were: a) to establish credence for later announced group compatibility (Katzell et al., 1970[b] and b) to check on similarity of the students. Despite a major attempt to match the students, several differences existed between the black and white students. (See Figure I.) The blacks reported themselves substantially different in social class, family income, father's occupation, parental influence and number of siblings in their family. The difficulty in matching the students in socioeconomic class appears to be characteristic of the student populations in U.S. colleges and particularly in recently integrated southern universities. (U.S. Bureau of the Census, 1970.) The black students did exceed whites in average age (19.5 vs. 18.9) and in a general satisfaction score toward a variety of activities and friends at school and home. (32.2 vs. 30.7.)

A sample of 96 male undergraduate students, 48 black and 48 white, were hired to role play as supervisors and subordinates in this study. Each of 12 black and 12 white older students, were selected to be supervisors, were randomly assigned to supervise three different racially mixed dyads of subordinates (one all black, one all white, and one with a black and a white subordinate). The remaining 72 students, 36 black and 36 white, were randomly assigned to one of the three different racially mixed subordinate dyads that participated once with a black supervisor and once with a white supervisor. All possible orders of supervisor and dyad combinations were represented twice to reduce the effect of order bias. The participants were paid three dollars per scheduled hour.

If their group finished before the end of the scheduled time period, they were permitted to leave. This increased the incentive to complete the tasks quickly.

Environment

The studies were conducted in the NASA/Psychology Laboratory at the University of Florida. Two adjacent rooms were used to conduct the study: an experimental room and an observation room (see Figure 2). A one-way mirror between the two rooms permitted observation of the participants by two trained observers with a minimum of distraction to the participants (see Figure 3). The experimental room contained:

a) three chairs around a circular table,

b) a rectangular table behind the circular table,

c) a small table and chair for the investigator,

d) two six-foot lengths of clothesline,

e) a microphone and tape recorder on the investigator's table,

f) and a microphone on the circular table connected to an amplifier.

The observation room contained:

a) two chairs on a raised platform near the one-way mirror,

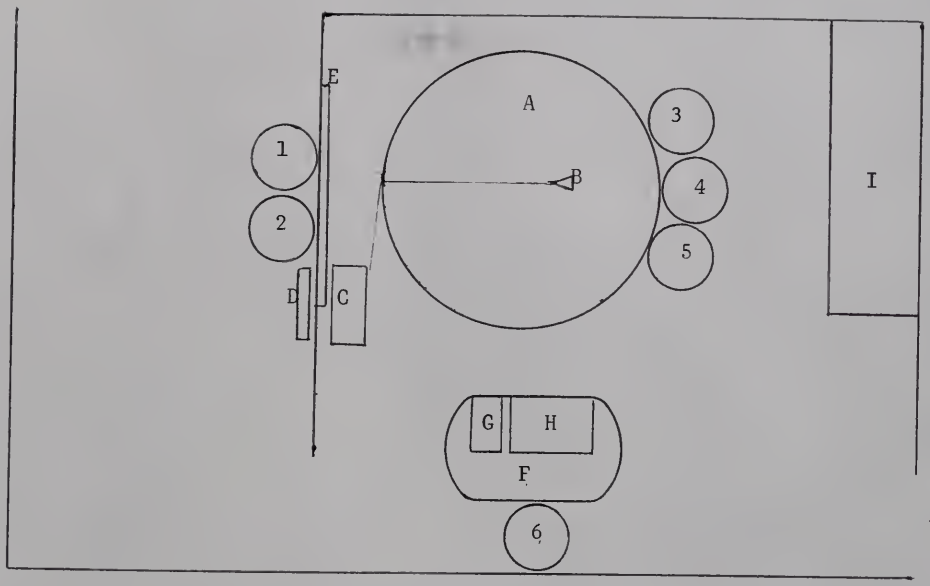
b) a speaker connected to the amplifier in the observation room,

c) and two large clipboards for the observers.

Tasks

Three tasks were chosen for study: two structured and one unstructured. Two of the tasks, the ship routing task and the recruiting

Figure 2
Photograph of Experimental Room as Seen Through the Observation Room



1 = Observer A (large circles are chairs)

2 = Observer B

3 = Subordinate A

4 = Supervisor (chair on rollers)

5 = Subordinate B

6 = Investigator

A = Work Table

B = Microphone

C = Amplifier

D = Speaker

E = One-way mirror

F = Investigator's table

G = Tape recorder

H = Brief case with stop watches

I = Evaluation table for supervisor

Figure 3
Layout of Experimental and Observation Rooms

letter were similar to those used by Fiedler (1966). The recruiting letter always was administered last to avoid contaminating behavior on the other tasks with possible carryover from negative attitudes about the military.

The structured tasks.-Two structured tasks were administered to each group in alternating order: a ship routing problem and a knot-tying problem. They were chosen because of shared goal and verbal interaction orientations. The tasks differed largely in the degree to which verbal skill was required. In the ship routing problem each group was asked to work together quickly in order to find the shortest route for a ship which had to touch five ports. Time for solution was the criterion for productivity. This task was rated by Shaw (1963) to be high on cooperation requirements, decision verifiability, and intellectual-manipulative requirements. Each of the three group members had only partial information sheets regarding the distances and availability of the routes between the different ports.(See Appendix B.) To assure group verbal interaction, the group members were told not to show each other the information sheets randomly distributed to them. However, they were encouraged to verbally communicate because the problem only could be solved by their working together as a group. To reinforce his leadership position, the supervisor had previously been trained in setting up a scatter map to record the matrix of distances between the ports. His function was to serve as the central communication point in solving the problem. The sooner the group reported a solution, the better was its productivity score measured by the total elapsed time to solve the problem. The supervisor then reported the group's readiness

to report a solution by raising his hand. All groups tried to identify several solutions before reporting a group solution. No group gambled with the first solution found. When an incorrect solution was reported, the investigator asked the group to work until it found the correct solution.

The second structured task required the group members to perform the physical task of tying one of two unusual knots: the French bowline and the double becket bend. Only one of the participants admitted prior knowledge of either of these knots. His individual and group performance scores were not considered atypical and, therefore, not excluded.

The investigator spent approximately one hour instructing each supervisor in a general familiarization of the three tasks. Knot tying proficiency and job instructional techniques were emphasized. Each supervisor received a personal five foot piece of clothesline and knot diagram in order to practice the two unusual knots in his leisure time. (See Appendix C.)

The supervisor instructed his two subordinates how to tie a designated knot. After the initial instruction period, the two subordinates were asked to duplicate the knot in the shortest period of time. Two clotheslines, one for each subordinate, were used to minimize time delays during the knot tying. The investigator determined if the knot was tied successfully. To maximize the group effort and verbal interaction, the instructions preceding the task encouraged verbal but no physical help from group members who had completed tying the knot successfully.

Productivity was the measure of the total elapsed time for the instruction by the supervisor and the duplication of the knot by the sub-

ordinates.

The unstructured task.-The unstructured task demanded a creative product. Each group, after completing the two structured tasks, was asked to develop a recruiting letter urging college students to join an all-volunteer Navy. This letter, containing no more than 250 words, was to be completed in 30 minutes. The groups were told that the letters would be judged on style, form, persuasiveness and originality.

The Observation

During the participation of the three tasks, the group members were observed by two observers (one black and one white) through the one-way mirror. In addition, the investigator used four stop watches to measure elapsed time of each task and total duration of speech of each of the three group members. The investigator also used a tape recorder to record the speech interchange of the group members during the performance of the three tasks so that group cohesiveness could be measured as described later in this chapter.

The Post-task Questionnaire Forms

After the completion of the three tasks by the group, each of the group members was asked to complete a three-page form evaluating the tasks and fellow group participants. (See Appendix D.) In addition, Ziller's self-esteem measure was completed by all participants after their last scheduled task was completed. (See Appendix E.)

Input Variables

The study involved the independent variable of race in the roles of subordinates and supervisors in problem solving groups. Race of

subordinate and supervisor was manipulated by the role playing of black and white students assigned to the specific roles. Students were assigned to form an equal number of the three subordinate dyad varieties: one all-black, one all-white, and one with a black and a white subordinate. These subordinate dyads then joined a supervisor to form a three-member problem solving group. Each subordinate dyad participated twice: once with a black supervisor and once with a white supervisor. Older students who opted to be supervisors were trained in the problem solving tasks. Each supervisor led three subordinate dyads: each of a different racial mixture (two black, two white, and one black and one white).

Mediating Structure

The leader position of the supervisor was operationalized by introducing him as being selected because of his training, ability and interest in group members and group activity. The investigator further strengthened the leader position by directing the supervisor to initiate and conclude all the tasks. For example, in the knot-tying task he was the instructor of the other two group members. In the ship routing task, he served as a central communicator in solving the problem. He reported a group solution by a signal of his hand. In the recruiting letter, his instructions were to pull together the group creative ideas and record them on a note pad. Hollander and Julian (1970) used this approach in manipulating subordinates' perceptions of the leader's authority, competence, and motivation.

To further control the group relationship, perception of the compatibility of the group members was initially established as suggested by

Katzell et al. (1970b) At the introduction of each group, all participants were advised that a biographical questionnaire they had completed earlier was used to match their background and interests. This questionnaire called for the following data: age, place of birth, number of siblings, community type when growing up, family income bracket, father's occupation, social class, and attitudes toward a variety of activities at school, home, etc. (See Appendix A.)

Output Variables

Differences in interaction, behavior, and attitudes were studied in six separate areas: (1) group productivity on the tasks, (2) group interaction processes, (3) group cohesiveness, (4) individual duration of speech, (5) individual self-esteem, and (6) individual satisfaction toward the tasks and fellow group members. Several instruments were used to operationalize these output variables. First, the time required to solve each of the two structured tasks was a measure of the productivity of each group. A stop watch recorded the time of task solution. The productivity of the unstructured task was measured by semantic differential ratings of the recruiting letters by thirteen different judges. To control for order effects, each judge rated a randomly varied order of the seventy-two letters. Since the product of this task was a recruiting letter aimed at college students, six black and seven white undergraduate male students did the rating. After a short training period to develop an understanding of the four dimensions to be judged, the students rated the letters in two two-hour time periods.(See Appendix F for letter-rating form.) Frequent breaks were allowed to reduce fatigue. The judges were also paid three dollars per hour.

Second, the Bales Interaction Process Analysis (IPA) (1950,1953) was used to operationalize the group processes (Bales and Gerbrands, 1948; Bales and Slater, 1955; Landsberger, 1955; Zdep, 1969; Richards, 1970; Katzell et al., 1970b). The twelve interaction variables were measured by four trained observers (two blacks and two whites) by observation through a one-way mirror. Each group session was observed by one black and one white observer to control for racial perception differences. The scheduling of observers was based on time availability. No particular sequence was followed except that all four possible combinations of observers served. An average interrater reliability coefficienct of .80 was obtained during the ten-hour training period from a set of video tapes made during the pilot study of the three tasks. Initiations of interaction in each of the 12 categories were coded and compared for supervisors and subordinates of both races. Certain categories of the IPA that show the supervisor initiating interactions on IPA categories 4 (giving suggestions), 5 (giving opinion), and 6 (giving information) were interpreted as directive leadership. Interaction by the supervisor on IPA categories 7 (asking for information), 8 (asking for opinion), and 9 (asking for suggestions) was interpreted as nondirective leadership as suggested by Katzell et al. (1970b).

Third, the proportionate usage of "we" or "I" was measured from recorded tapes of the group tasks to determine group cohesiveness. French (1941) found that this unobtrusive measure related cohesiveness to quality of interaction. Shaw (1971) concluded that no current measures take into account all aspects of group spirit.

Fourth, individual group members were measured by three separate stop

watches activated by the experimenter. Bass (1960) and Jaffee (1970) have shown this technique to be a reliable method of recording absolute duration of speech.

Fifth, expressed self-esteem of each of three group members was measured by the social self-esteem portion of the Social Orientation Tasks of Ziller et al. (1969). (See Appendix E.) Ziller reports greater validity and utility of this linear ordering measurement of self in the environment over the usual self-report measures because of limited verbal demands and low visibility. Correlation of social self-esteem with status identification by male college students was significant ($r = .46$.) Results comparing social self-esteem reported negative or very low correlations. Ziller suggests that social self-esteem is in a different psychological domain that measures self-other perceptions without the demand influence of social desirability.

Sixth, individual satisfaction toward work in the tasks and fellow group members (supervision and subordinate) was measured by having the subjects complete the Job Description Index (JDI) scales of Smith (1969). Only portions of the JDI scales evaluating work, supervision and fellow subordinates were used in order to fit the particular work and group environment (see Appendix D).

Procedure

Four graduate students, two black and two white, were hired and trained as observers. Chapter 3 of Bales (1950) was used as background training material. A pilot study of the three tasks with three paid participants (one black and two whites) was run to familiarize the observers with the activities in each experimental condition. Video tapes

of the pilot study were further used to train the observers and to compute interrater reliability. Observer training was concluded when reliability reached .80. Two observers (one black and one white) sat in the observation room and measured the group interaction by IPA.

Each dyad of two subordinates was scheduled for two two-hour group sessions. One supervisor was also scheduled to participate in the first two-hour session, but, after one session, he was replaced with a supervisor from the opposite race and another two-hour group session was held. Each dyad of subordinates thus participated together in two two-hour sessions, one with a black supervisor and one with a white supervisor. Each supervisor returned at other times to lead two additional sessions of different racially mixed groups. The group sessions were scheduled over eight weeks in the spring of 1972 with a four-week intermission for final exams, quarter break, and registration.

For each session, the participants gathered at the experimental room at the appointed time with the investigator. The participants were instructed to sit at the round table with the supervisor in the middle on a chair with rollers.(See Figure 3.) Subjects were informed that the purpose of the study was the analysis of group problem solving effectiveness, but observation was a necessary part of this analysis. They were told that the two observers were placed behind the one-way mirror in order not to distract the participants. A standard set of introductory remarks (See Appendix G) was read to each group. The group compatibility was established by the following statement: The biographical questionnaire like you filled out the first time you met with me has been successfully used in determining the compatibility of groups in previous research. Your

group was selected to be compatible so you should enjoy the activity and perform it efficiently. Leader position of the supervisor was also established at this time by the investigator's introduction. Specific task instructions were then explained and questions answered to clear up misunderstandings before beginning each task. For each new subordinate dyad a random selection of the two structured tasks was presented. The second session of the dyad then performed the other task first. In all group sessions the unstructured task of the recruiting letter was presented last to avoid possible contamination of the other two tasks if the participants held negative attitudes toward military recruiting.

After the investigator signaled the supervisor to begin the assigned task, the total participation time (duration of speech) of each group member was recorded with stop watches. When a group member began to speak, the investigator depressed the start button, allowed the stop watch to run for the duration of the speech, and stopped the watch by depressing the stop button when the group member ceased to speak. This method accumulated total participation time for each group member. A stop watch also recorded the total time for completion of the two structured tasks. The unstructured task had a thirty-minute time limit. Time remaining was announced at the end of each ten-minute period to ensure task completion.

At the completion of the three tasks, the group members were asked to take a few minutes to complete a few forms. The investigator gave the supervisor his forms and asked him to turn around and roll his chair to the table behind him to reduce peer pressure to complete the evaluation forms. The investigator also asked each group member to make

his comments on the forms as objectively as possible and related to the activity involved in the tasks only. This was done to reduce the halo effect that friends might bestow on each other. After completion of the satisfaction and self-esteem forms, the investigator thanked the group members for their participation in the study and asked them not to discuss details of the study with anyone until after April 30th, since advanced knowledge of the details would limit the value of the study and all groups should be equally unprepared. They were also told that the results of the study would be shared with them if interested. Payment arrangements were then discussed and the group thanked again.

Interrater reliability.-After the first and second weeks of the study, interrater reliability sample checks were run to test for differences in ratings by the observers. No significant differences were found at this point. The final reliability comparisons of the white and black observers were checked with Spearman rank correlations for 12 categories over three dyads. Table 1 shows that white and black raters were in greater agreement when the dyad of observation was white or mixed rather than black. Whether this difference in correlation was attributable to the race or the response set of the observer is open to question since all dyads were rated by only one white and one black observer. However, different response sets of raters have been reported by Fiedler (1967). He explained that the differences in French-speaking and Dutch-speaking judges resulted from different response sets inherent in the culture.

TABLE 1

Spearman Rank Correlations of White and Black Observers on Interpersonal Behavior of White, Mixed, and Black Dyads

Bales' IPA Categories	White	Mixed	Black
1. Shows solidarity	.969	.966	.940
2. Tension release	.978	.679	.775
3. Agrees, accepts	.828	.722	.596
4. Gives suggestion	.840	.789	.929
5. Gives opinion	.955	.871	.847
6. Gives information	.934	.807	.863
7. Asks information	.847	.927	.822
8. Asks opinion	.848	.624	.507
9. Asks suggestion	.878	.888	.586
10. Disagrees	.901	.912	.873
11. Shows tension	.850	.965	.812
12. Shows antagonism	.888	.940	.595

CHAPTER III

RESULTS

A few of the hypotheses examined in this study have been tested in other researches and the results have shown some evidence of directionality. Other directional hypothesis have been suggested by hunches and stereotyped assumptions held by blacks and whites alike. In order to ferret out as many differences between blacks and whites as our measures will test, we decided previously to state and test study results in the null form and to present these results in this chapter. The discussion in Chapter IV will bring out the relationships of the null hypotheses to some directional hypotheses suggested by research evidence, hunches, and stereotyped assumptions.

The results section is divided into five parts. Part one reports on differences between black and white supervisors. Part two reports on differences between black and white subordinates. Part three presents differences between subordinates in black, white, and mixed dyads. Part four presents differences between black and white supervised dyads. Part five presents supplementary findings between black and white subordinates in the mixed dyads.

Differences Between Supervisors

This part presents the results of tests of the null hypotheses that there are no differences between black and white supervisors in measures of (a) interpersonal behavior (IPA), (b) style of leadership (IPA), (c)

duration of speech, (d) self-esteem, (e) satisfaction with subordinates, and (f) satisfaction with work in the tasks.

IPA behavior.-Hypothesis 1 (a) states there are no differences in interpersonal behavior (IPA) between black and white supervisors. Interpersonal behavior initiations by black and white supervisors were coded by two observers into twelve different IPA categories. The total number of behaviors initiated in all three tasks for each category was converted to behavior frequencies per unit of time.[1] The total frequencies per unit of time for black and white supervisors then were ranked by the Mann-Whitney U test (Siegel, 1956) with the assistance of the University of Florida Statistical Program Library.[2] Table 2 shows the U values and z scores of IPA behavior and indicates that in the aggregate, white supervisors asked for significantly more opinions ($p < .05$) and suggestions ($p < .05$) than black supervisors. However, Table 2 also shows this difference was not significant within any one of the three types of dyads. Thus, hypothesis 1 (a) was rejected because differences were found in categories 8 and 9.

Styles of leadership.-Hypothesis 1 (b) states there are no differences between black and white supervisors in leadership style. Two types of leadership styles were defined: directive and nondirective. Styles of leadership were measured by summing the frequencies per unit of time for three categories of interpersonal behavior. Directive leadership was defined as the sum of behavior categorized by giving suggestions, opinion, and information (categories 4, 5, and 6). Nondirective leadership was defined as the sum of behaviors categorized by asking for information,

TABLE 2

U Values and Z Scores of IPA Behavior Differences Between Black and White Supervisors Overall and in Separate White, Mixed, and Black Dyads

IPA Categories	White Dyad		Mixed Dyad		Black Dyad		Aggregate of all Dyads		
	Supervisors		Supervisors		Supervisors		Supervisors		Observed
	White	Black	White	Black	White	Black	White	Black	Z
1. Shows solidarity	60	84	76	68	56	88	576	720	.8254
2. Tension release	73	71	76	68	93	51	721	575	.8225
3. Agrees, accepts	43	101	74	70	72	72	554	742	1.0643
4. Gives suggestion	92	52	52	92	68	76	652	644	.0450
5. Gives opinion	62	82	69	75	71	73	618	678	.3322
6. Gives information	72	72	84	60	78	66	702	594	.6082
7. Asks information	65	79	52	92	82	62	607	689	.4618
8. Asks opinion	39	105	56	88	46	98	432	864	2.4331 *
9. Asks suggestion	63	81	40	104	50	94	471	825	1.9936 *
10. Disagrees	49	95	72	72	83	61	623	673	.2816
11. Shows tension	77	67	68	76	72	72	645	651	.0377
12. Shows antagonism	65	79	71	73	88	56	662	634	.1573

TABLE 2 continued

NOTE: The value of Mann-Whitney U is determined by the number of times that a score of frequencies per unit of time in the black supervisors with 12 cases precedes a score of frequencies per unit of time in the white supervisors with 12 cases in the ranking.

A low score indicates high rank, hence, higher frequencies per unit of time

Critical values of U ($n_1 = 12$, $n_2 = 12$), two-tailed test
$p < .05$ (U = 37)

Critical value of Z, two-tailed test
* $p < .05$ (Z = 1.96)

opinion, and suggestions (categories 7, 8, and 9). The sums of the categories showing a directive style of leadership with all subordinates were ranked and compared for black and white supervisors. The same procedure was followed for nondirective leadership styles. Table 3 shows U values and z scores which indicate no significant differences in the aggregate between black and white supervisors in either directive or nondirective leadership style. Table 3 also shows no significant differences between the leadership styles employed by black and white supervisors when supervising dyads of black, white, or racially mixed subordinates. Thus, hypothesis 1 (b) was accepted.

Duration of speech.- Hypothesis 1 (c) states that there are no differences between black and white supervisors in duration of speech. Duration of speech was measured by the total time talked by each supervisor in the three tasks. The ranks of these speech durations were compared for black and white supervisors.[3] Table 4 shows no significant differences between black and white supervisors in duration of speech. Thus, hypothesis 1 (c) was accepted.

Self-esteem.-Hypothesis 1 (d) states that there are no differences between black and white supervisors in self-esteem. Self-esteem was measured at the end of the third group assignment by the social self-esteem instrument of Ziller et al. (1969). Table 4 shows the U values and z scores of self-esteem and indicates no significant differences between black and white supervisors in self-esteem. Thus, hypothesis 1 (d) was accepted.

TABLE 3

U Values and Z Scores of Leadership Style Differences Between Black and White Supervisors with All Subordinates and with White, Black, or Mixed Racial Dyads of Subordinates

	All Subordinates			White Dyad		Black Dyad		Mixed Dyad	
	Supervisor		Observed	Supervisor		Supervisor		Supervisor	
Bales IPA	Black	White	Z	Black	White	Black	White	Black	White
Directive Leadership Style (Sum of Categories 4, 5, 6)	661	635	.1464	57	87	70	74	89	55
Nondirective Leadership Style (Sum of Categories 7, 8, 9)	803	493	1.7457	92	52	76	68	100	55

NOTE: A low score indicates high rank, hence, higher frequency per unit of time

Critical value of observed z, two-tailed test $p < .05$ ($Z = 1.96$)

Critical value of U ($n_1 = 12$, $n_2 = 12$), two-tailed test $p < .05$ ($U = 37$)

TABLE 4

U Values and Z Scores of Duration of Speech, Self-esteem, Satisfaction with Work and Subordinates Between Black and White Supervisors

	Supervisors		Observed
	Black	White	Z
Duration of speech	616	680	.3604
Self-esteem	634	662	.1530
Satisfaction with subordinates	659	637	.1240
White subordinates	639	657	.1016
Black subordinates	644	652	.0508
Satisfaction with work	646	650	.0282

NOTE: A low score indicates high rank, hence, higher frequency per unit of time
Critical values of observed Z ($n_1 = 36$, $n_2 = 36$), two-tailed test $p < .05$ ($z = 1.96$)

Satisfaction with subordinates.-Hypothesis 1 (e) states that there are no differences in satisfaction with subordinates between black and white supervisors. Satisfaction with subordinates was one of the three job satisfaction measures used from the Job Description Index (JDI) scales of Smith (1969). Each supervisor was asked to complete a satisfaction scale after supervising a dyad in the three tasks. Table 4 shows the U values and z scores of satisfaction with subordinates and indicates no significant differences between black and white supervisors. Thus, hypothesis 1 (e) was accepted.

Satisfaction with work in the tasks.- Hypothesis 1 (f) states that there are no differences in satisfaction with work between black and white supervisors. Satisfaction with work was another of the JDI scales completed by the supervisor after supervising each of the three dyads. Table 4 shows the U values and z scores of satisfaction with work in the tasks and indicates no significant differences between black and white supervisors. Thus, hypothesis 1 (f) was accepted.

Differences Between Subordinates

This part presents the results of tests of the null hypotheses that there are no differences between black and white subordinates in measures of: (a) interpersonal behavior (IPA), (b) duration of speech, (c) self-esteem, (d) satisfaction with their fellow subordinates, (e) satisfaction with their supervisor, and (f) satisfaction with work in the tasks.

IPA behavior.-Hypothesis 2 (a) states there are no differences between black and white subordinates in interpersonal behavior. Initiations

of interpersonal behavior by black and white subordinates were observed and coded by two observers in the same manner described in part one. Behavior frequencies per unit of time were ranked for all black and white subordinates disregarding racial mixture of the dyad. Table 5 shows the U values and z scores of IPA behavior and indicates that white subordinates gave significantly more suggestions ($p < .01$) and information ($p < .001$) than black subordinates. Thus, hypothesis 2 (a) was rejected because differences were found in 4 and 6.

Duration of speech.-Hypothesis 2 (b) states there are no differences between black and white subordinates in duration of speech. Duration of speech was measured by the total time talked by each subordinate. Table 6 shows the U values and z scores of duration of speech and indicates no significant difference between black and white subordinates in duration of speech. Thus, hypothesis 2 (b) was accepted.

Self-esteem.-Hypothesis 2 (c) states there are no differences between black and white subordinates in self-esteem. Self-esteem was measured by Ziller's instrument at the end of the third task. The scores were ranked and compared for all black subordinates and all white subordinates irrespective of the racial mixture of the dyads. Table 6 shows the U values and z scores of self-esteem and indicates that black subordinates perceived themselves significantly higher ($p < .05$) in self-esteem than white subordinates. Hypothesis 2 (b) was therefore rejected.

Satisfaction with fellow subordinates.-Hypothesis 2 (d) states there are no differences between black and white subordinates in satisfaction

TABLE 5

U Values and Z Scores of IPA Behavior Differences
Between Black and White Subordinates

IPA Categories	Subordinates		Observed
	Black	White	Z
1. Shows solidarity	2648	2536	.2399
2. Tension release	2848	2336	1.0295
3. Agrees, accepts	2788	2395	.7851
4. Gives suggestion	3342	1842	2.9947 **
5. Gives opinion	2871	2313	1.1148
6. Gives information	3374	1810	3.1265 ***
7. Asks information	2707	2477	.4595
8. Asks opinion	2778	2406	.7666
9. Asks suggestion	2738	2446	.7183
10. Disagrees	2416	2768	.7043
11. Shows tension	2470	2713	.6321
12. Shows antagonism	2564	2619	.1328

NOTE: A low score indicates high rank, hence, higher frequency per unit of time
Critical value of U ($n_1 = 72$, $n_2 = 72$), two-tailed test
$p < .05$
** $p < .01$
*** $p < .001$

TABLE 6

U Values and Z Scores of Duration of Speech, Self-esteem, Satisfaction with Fellow Subordinates, Supervisors, and Work Between Black and White Subordinates

	Subordinates		Observed
	Black	White	Z
Duration of speech	2742	2442	.5994
Self-esteem	1982	3202	2.4448 *
Satisfaction with fellow subordinates	1940	3244	2.6106 **
White fellow subordinate ($n_1 = 48$, $n_2 = 24$)	352	800	2.6759 **
Black fellow subordinate ($n_1 = 24$, $n_2 = 48$)	512	640	.7683
Satisfaction with supervisor	2387	2797	.8210
White supervisor ($n_1 = 36$, $n_2 = 36$)	740	556	1.0382
Black supervisor ($n_1 = 36$, $n_2 = 36$)	606	690	.4806
Satisfaction with work	2163	3021	1.7164

NOTE: A low U value indicates high rank, hence, a higher value
critical values of observed Z ($n_1 = 72$, $n_2 = 72$ or $n_1 = 36$, $n_2 = 36$)

* $p < .05$, two-tailed test

** $p < .01$

with fellow subordinates. Satisfaction with fellow subordinate was another JDI scale where each subordinate rated the other subordinate in his dyad at the end of the third task. Table 6 indicates that black subordinates rated all fellow subordinates significantly higher ($p < .01$) than white subordinates did. This satisfaction with the fellow subordinate was particularly significant ($p < .01$) when the fellow subordinate was white. When the fellow subordinate was black, the difference between the black and white ratings was not significant. Thus, hypothesis 2 (d) was rejected.

Satisfaction with supervisor.-Hypothesis 2 (e) states there are no differences between black and white subordinates in satisfaction with their supervisor. Satisfaction with supervisor was another JDI measure where each subordinate rated his supervisor. Table 6 indicates no significant difference between black and white subordinates in satisfactions with their supervisor whether the supervisor was black or white. Thus, hypothesis 2 (e) was accepted.

Satisfaction with work in the tasks.-Hypothesis 2 (f) states there are no differences between black and white subordinates in satisfaction with work in the tasks. Satisfaction with work was also a JDI scale that measured satisfaction with the three tasks. Table 6 indicates no significant differences between black and white subordinates in satisfaction with work in the tasks. Thus, hypothesis 2 (f) was accepted.

Differences Between Subordinates in Dyads

This part presents the results of tests of the null hypotheses that

there are no differences between dyads composed of black, white, and racially mixed subordinates in measures of: (a) interpersonal behavior (IPA), (b) productivity by type of tasks, (c) cohesiveness, (d) self-esteem, (e) duration of speech, (f) satisfaction with fellow subordinates, (g) satisfaction with their supervisors, and (h) satisfaction with work in the tasks.

IPA behavior.-Hypothesis 3 (a) states there are no differences between dyads composed of black, white, and racially mixed subordinates in interpersonal behavior. Interpersonal behavior initiations by subordinates in black, white, and mixed dyads were observed, coded, and converted to frequencies per unit of time. The frequencies then were ranked in pairs of the three dyads, since the Mann-Whitney U test can compare two samples only. All possible comparisons of the three dyads were ranked. As a result of this breakdown in comparing the three dyads, the .05 significance level was divided by 3 to obtain a protection level of .0167.[4]

Table 7 shows U values and observed z scores of IPA behavior and indicates no significant differences between the three dyads for any of the 12 IPA categories at the .0167 level. If a less stringent significance level of .05 were used, category 9 would be significantly different between white and mixed dyads. Subordinates in white dyads asked for more suggestions than subordinates in mixed dyads. Because of the number of Mann-Whitney U tests run, this difference may have resulted from chance. On the basis of the more conservative significance level, hypothesis 3 (a) was accepted.

TABLE 7

U Values and Z Scores of IPA Behavior Differences Between Dyads of White, Black, and Mixed-Racial Subordinates

Bales IPA	DYADS		Observed	DYADS		Observed	DYADS		Observed
	White	Black	Z	Mixed	Black	Z	Mixed	White	Z
1. Shows solidarity	1114	1190	.2990	1038	1266	.8971	1099	1205	.4152
2. Tension release	1000	1304	1.1234	918	1386	1.7214	1120	1184	.2392
3. Agrees, accepts	1040	1264	.8244	1099	1205	.3884	1202	1102	.3664
4. Gives suggestion	968	1336	1.3446	928	1376	1.6377	1117	1187	.2565
5. Gives opinion	1119	1185	.2418	1256	1048	.7657	1306	998	1.1248
6. Gives information	888	1416	1.9309	1094	1210	.4250	1373	931	1.6194
7. Asks information	1062	1242	.6559	1060	1244	.6742	1152	1152	0
8. Asks opinion	1124	1180	.2103	1252	1052	.7570	1270	1034	.9043
9. Asks suggestion	1024	1280	1.0930	1298	1006	1.4118	1412	892	2.3775
10. Disagrees	1273	1031	.8870	1387	917	1.7260	1304	1000	1 1169
11. Shows tension	1234	1070	.7786	1215	1089	.5899	1126	1178	2496
12. Shows antagonism	1100	1204	.4499	1170	1134	.1669	1213	1091	.5383

NOTE: A low U value indicates high rank, hence, a higher frequency per unit of time
Protection level of observed Z
$p < .0167 = 2.39$

Productivity by tasks.-Hypothesis 3 (b) states there are no differences in productivity between dyads composed of black, white, and racially mixed subordinates. Productivity of the two structured tasks (knot tying and ship routing) was measured by the time required to complete the tasks. Productivity of the unstructured task (letter writing) was measured by the average ratings of the 13 judges (7 white and 6 black).[5]

The productivities on the three tasks were compared in pairs of the three subordinate dyads with the aid of the Mann-Whitney U test. Table 8 shows U values and z scores and indicates no significant differences between the three dyads for measures of productivity in knot tying, ship routing, and letter writing at the .0167 level. Thus, hypothesis 3 (b) was accepted.

Cohesiveness.-Hypothesis 3 (c) states there are no differences between dyads composed of black, white and racially mixed subordinates in cohesiveness. Cohesiveness was measured by the proportionate usage of "we" to "I" tallied from recorded tapes of the dyad tasks. The resulting proportions were ranked with the Mann-Whitney U test. Table 8 shows the U values and z scores of cohesiveness and indicates no significant difference between the three dyads in cohesiveness at the .0167 level. If a less stringent significance level of .05 were used, the mixed dyads expressed more cohesion than the black dyads. However, at the stated protection level of .0167, there were no differences and hypothesis 3 (c) was accepted.

TABLE 8

U Values and Z Scores Differences in Productivity Cohesiveness, Self-esteem, Duration of Speech, and Satisfaction With Fellow Worker, Supervisor, and Work Between Dyads of White, Black, and Mixed-Racial Subordinates

	DYADS		Observed	DYADS		Observed	DYADS		Observed
	White	Black	Z	White	Mixed	Z	Black	Mixed	Z
Productivity									
Knot	1422	882	1.9796	1314	990	1.1876	964	1340	1.3782
Ship	1390	914	1.7447	1244	1060	.6744	988	1316	1.2022
Letter	220	356	1.3923	267	309	.4333	344	232	1.1654
Cohesiveness	202	374	1.7750	294	258	.3834	374	178	2.0980
Self-esteem	1268	1036	.8526	1314	990	1.1903	1120	1184	.2357
Duration of speech	1264	1040	.8208	1260	1044	.7951	1060	1244	.6742
Satisfaction with fellow subordinate	1462	842	2.2808	1448	856	2.1786	1106	1198	.3422
Satisfaction with supervisor	1235	1069	.6099	1094	1210	.4222	992	1312	1.1799
Satisfaction with work	1266	1038	.8364	1243	1061	.6679	1170	1134	.1285

NOTE: A low U value indicates high rank, hence, a higher score
Protection level of observed Z
$p < .0167 = 2.39$

Self-esteem.-Hypothesis 3 (d) states there are no differences between dyads composed of black, white, and racially mixed subordinates in self-esteem. Self-esteem of individual subordinates was measured by Ziller's instrument and grouped together in dyad rank comparisons with other dyads. Table 8 shows U values and z scores of self-esteem and indicates that there are no significant differences between the three dyads at the .0167 level. Thus, hypothesis 3 (d) was accepted.

Duration of speech.-Hypothesis 3 (e) states there are no differences between dyads composed of black, white, and racially mixed subordinates in duration of speech. Duration of speech, as measured by the total time spoken by each subordinate, was grouped together in dyad rank comparisons with other dyads. Table 8 shows U values and z scores and indicates no significant difference in duration of speech between the three dyads at the .0167 level. Thus, hypothesis 3 (e) was accepted.

Satisfaction with fellow subordinates.- Hypothesis 3 (f) states there are no differences between dyads composed of black, white, and racially mixed subordinates in satisfaction with their fellow subordinates. Individual ratings of satisfaction with fellow subordinates were measured by the JDI scale and grouped together in dyad rank comparisons with other dyads. Table 8 shows U values and z scores which indicate no difference between the three dyads at the .0167 level in satisfaction with fellow subordinates. If the less stringent significance level of .05 were used, subordinates in black and mixed dyads expressed greater satisfaction with their fellow subordinates than subordinates in white dyads. However,

hypothesis 3 (f) was accepted at the .0167 level.

Satisfaction with supervisor.-Hypothesis 3 (g) states there are no differences between dyads composed of black, white, and racially mixed subordinates in satisfaction with their supervisors. The ratings by individual subordinates of their supervisors were measured by the JDI scale, grouped by type of dyad, and ranked with the Mann-Whitney U test. Table 8 shows U values and z scores which indicate no significant difference between the three dyads in satisfaction with their supervisors. Thus, hypothesis 3 (g) was accepted.

Satisfaction with work in the tasks.-Hypothesis 3 (h) states there are no differences between dyads composed of black, white, and racially mixed subordinates in satisfaction with work in the tasks. Individual ratings of satisfaction with work were measured by a JDI scale, grouped by type of dyad, and ranked with the Mann-Whitney U test. Table 8 shows U values and z scores which indicate no significant differences between the three dyads in satisfaction with work in the tasks. Thus, hypothesis 3 (h) was accepted.

Differences Between Supervised Dyads

This part presents the results of tests of the null hypotheses that there are no differences between dyads composed of black, white, and racially mixed subordinates supervised by black or white supervisors in measures of: (a) productivity by tasks, (b) cohesiveness, (c) duration of speech, (d) satisfaction with their supervisors, and (e) satisfaction with work in the tasks. The group measures of productivity and cohesiveness, along with the combined individual measures of duration of speech, satisfaction with supervisors, and satisfaction with work were

each ranked in a single series for each of the six different group combinations of supervisors and subordinate dyads (i.e., white supervisor with white dyad, white supervisor with black dyad, white supervisor with mixed dyad, black supervisor with white dyad, black supervisor with black dyad, and black supervisor with mixed dyad).

Productivity by type of task.-Hypothesis 4 (a) states there are no differences between black and white supervised dyad combinations in productivity in the three tasks. Productivity in terms of completion time of the two structured tasks (knot tying and ship routing) were ranked by the Kruskal-Wallis (H) one-way analysis of variance to test whether the six independent group combinations differed. Table 9 shows the rank sums and observed H of the productivity measures of the two structured tasks. No significant differences were found between the different groups. Productivity in terms of average judge ratings of the recruiting letters also was compared with the Kruskal-Wallis H test. Table 9 reports the summed ranks and observed H which indicates no significant differences between the six different groups. Thus, hypothesis 4 (a) was accepted.

Cohesiveness.-Hypothesis 4 (b) states there are no differences between the black and white supervised dyad combinations in cohesiveness. Cohesiveness, as measured by the proportionate usage of "we" to "I" tallied from recorded tapes of the different groups, were ranked with a Kruskal-Wallis H test over the six different group combinations. Table 9 shows the ranked sums and observed H which indicates that cohesiveness of the groups varies significantly ($p < .02$). Further analysis of the groups, two by two, with a Mann-Whitney U test reveals in Table 10 that white dyads

TABLE 9

Rank Sums and Resulting H Values of Six Different Supervised Groups on Measures of Productivity, Cohesiveness, Duration of Speech, Satisfaction with Supervisors, and Satisfaction with Work

Productivity	Supervisor / Subordinate Dyad	W H I T E			B L A C K			Observed H
		White	Black	Mixed	White	Black	Mixed	
Knot		369	473	432	400	518	438	4.61
Ship		388	570	510	346	386	386	4.90
Letter		398	281	364	562	459	538	8.28
Cohesiveness		526	355	531	431	340	480	14.17 **
Duration of speech		380	494	445	437	445	381	4.32
Satisfaction with supervisor		489	448	437	359	517	379	5.38
Satisfaction with work		483	421	376	443	394	453	4.26

** $p < .05$
** $p < .02$

TABLE 10

U Values of Cohesion Differences Between Individual Pair Comparisons of Supervisors and Subordinate Dyads

SUPERVISOR	DYAD		SUPERVISOR	DYAD	
White	White	37 *	White	White	54
White	Black	107	Black	White	90
White	White	74	White	Mixed	60
White	Mixed	70	Black	Mixed	84
White	Black	104	White	Black	64
White	Mixed	40	Black	White	80
Black	White	56	White	Black	92
Black	Black	88	Black	Mixed	52
Black	White	67	White	Black	60
Black	Mixed	77	Black	Black	84
Black	Black	94	White	White	44
Black	Mixed	50	Black	Black	100

NOTE: A low score indicates high rank, hence, greater cohesion
Critical value of U ($n_1 = 72$, $n_2 = 72$) two-tailed test

* $p < .05$
$p < .02$
$p < .01$

supervised by white supervisors were significantly ($p < .05$) higher in cohesiveness than black dyads supervised by white supervisors.[6] Thus, hypothesis 4 (b) was rejected.

Duration of speech.-Hypothesis 4 (c) states there are no differences between black and white supervised dyad combinations in duration of speech. The duration of speech measures of the two subordinates in the six different dyad combinations was totaled and ranked with the Kruskal-Wallis H test. Table 9 shows the rank sums and observed H which indicates no significant difference between the six different groups in duration of speech. Thus, hypothesis 4 (c) was accepted.

Satisfaction with supervisors.-Hypothesis 4 (d) states there are no differences between black and white supervised dyad combinations in satisfaction with their supervisors. Satisfaction with supervisor scores from the JDI rating scales of the subordinates in the dyads were totaled and ranked with Kruskal-Wallis H test. Table 9 shows ranked sums and observed H which indicate no significant difference between the six different groups in satisfaction with supervisors. Thus, hypothesis 4 (d) was accepted.

Satisfaction with work in the tasks.-Hypothesis 4 (e) states there are no differences between the black and white supervised dyad combinations in satisfaction with work in the tasks. Satisfaction with work from the JDI rating scales of the two subordinates in the dyads were totaled and ranked with the Kruskal-Wallis

H test. Table 9 shows ranked sums and observed H which indicates no significant difference between the six different groups in satisfaction with work in the tasks. Thus, hypothesis 4 (e) was accepted.

Supplementary Findings

When relating the differences between black and white subordinates in the aggregate comparisons of Table 6 to the dyad comparisons in Table 8, certain inconsistencies became apparent. For example, Table 6 shows that the black subordinates in the aggregate had significantly ($p < .05$) higher self-esteem than white subordinates. However, Table 8 shows no difference in self-esteem in the comparison of the homogeneous (all black and all white) dyads of subordinates. An answer to this inconsistency was found in a further analysis of black and white subordinates in the heterogeneous (mixed) dyads.

Difference in Heterogeneous Dyads

Statistical tests were made to determine if differences existed within the heterogeneous dyads on measures of self-esteem, duration of speech, satisfaction with fellow subordinate, satisfaction with supervisor, satisfaction with work in the tasks, and IPA behavior. Although Mann-Whitney U tests were used to test for differences, mean comparisons were presented for illustration of the variance between subordinates in homogeneous and heterogeneous dyads.

Self-esteem.-Table 11 indicates that although black and white subordinates reported no difference in self-esteem when they worked

TABLE 11

Mean and Z Score Differences Between Black and White Subordinates in Homogeneous and Heterogeneous Dyads

		Homogeneous Dyads Means	Observed Z	Heterogeneous Dyads Means	Observed Z
SELF-ESTEEM	Black	26.42	.8526	29.17	2.7361 **
	White	25.54		23.50	
DURATION OF SPEECH	Black	9.66	.8208	7.89	2.2892 *
	White	9.39		10.27	
SATISFACTION WITH FELLOW SUBORDINATE	Black	39.27	2.2808 *	41.33	1.1087
	White	36.06		37.25	
SATISFACTION WITH SUPERVISOR	Black	35.71	.6099	34.79	.4654
	White	34.60		33.50	
SATISFACTION WITH WORK	Black	30.17	.8364	33.29	1.9633 *
	White	29.38		29.33	

Critical value of observed Z, two-tailed test
* $p < .05$
** $p < .01$

in all black or all white dyads, blacks exhibited a significantly ($p < .01$) higher self-esteem than whites when grouped in heterogeneous dyads. Thus, the aggregate difference in self-esteem between blacks and whites reported in Table 6 is due to the tendency for blacks to show higher self-esteem scores and whites to exhibit lower scores when placed in heterogeneous as compared to homogeneous dyads.

Duration of speech.-Although no difference in duration of speech was found between black and white subordinates in the aggregate comparison (Table 6) or in the homogeneous dyad comparison (Table 8), Table 11 indicates that white subordinates illustrated a significantly ($p < .05$) higher duration of speech than black subordinates in the heterogeneous dyads. Table 11 shows that the difference resulted because white subordinates had a tendency to talk more and black subordinates had a tendency to talk less when placed in heterogeneous as compared to homogeneous dyads.

Satisfaction with fellow subordinate.-Table 11 shows the single pair comparison between black and white dyads where blacks were significantly ($p < .05$) more satisfied with their fellow subordinate. When placed in heterogeneous as compared to homogeneous dyads, the difference between blacks and whites was not significant.

Satisfaction with supervisor.-Table 11 shows z scores which indicates no difference between black and white subordinates in heterogeneous or homogeneous dyads. This finding confirms the

result found in Table 6 that race of the supervisor did not affect the satisfaction expressed by black or white subordinates of their supervisor.

Satisfaction with work.-Table 11 indicates that although black and white subordinates reported no difference in satisfaction with work when they worked in all black or all white dyads, blacks exhibited significantly ($p < .05$) greater satisfaction with work than whites when grouped in heterogeneous dyads. However, this difference was not great enough to affect the difference in the aggregate comparison of black and white subordinates.

IPA behavior.-IPA behavior of the black and white subordinates was also studied more thoroughly to determine if the type of interpersonal behavior differed within the heterogeneous dyad. Table 12 reports that white subordinates gave significantly more suggestions ($p < .001$) and information ($p < .01$) than their fellow black subordinate. The increase in duration of speech reported in Table 11 for white subordinates may have resulted from the increase in IPA behavior by white subordinates.

IPA with different supervisors.-Throughout the study we have seen few, if any, differences traceable to the differences of race of the supervisors. Table 13 reports that IPA behavior of black and white subordinates differed on only one of the IPA categories in heterogeneous dyads. White subordinates gave suggestions significantly more ($p < .01$) with white supervisors than did black

TABLE 12

U Value and Z Score Differences in Interpersonal Behavior Between Black and White Subordinates in Heterogeneous Dyads

Bales IPA Categories	Black	White	Observed Z	
1. Shows solidarity	286	290	.0441	
2. Tension release	293	283	.1034	
3. Agrees, accepts	295	281	.1443	
4. Gives suggestion	458	118	3.5055	***
5. Gives opinion	374	202	1.7733	
6. Gives information	414	162	2.5981	**
7. Asks information	286	290	.0309	
8. Asks opinion	334	242	1.0164	
9. Ask suggestion	274	302	.4088	
10. Disagrees	281	295	.1455	
11. Shows tension	290	286	.0678	
12. Shows antagonism	253	323	.8988	

NOTE: A lower U value indicates higher rank, hence, higher frequencies per unit of time
Critical value of observed Z ($n_1 = 48$, $n_2 = 48$), two-tailed test
$p < .05$
** $p < .01$
*** $p < .001$

TABLE 13

U Values of IPA Behavior Differences Between White and Black Subordinates in Heterogeneous Dyads with White and Black Supervisors

	White Supervisor		Black Supervisor	
Bales IPA	White	Black	White	Black
1. Shows solidarity	102	42	54	90
2. Tension release	60	84	74	70
3. Agrees, accepts	75	69	48	96
4. Gives suggestion	23 **	121	62	82
5. Gives opinion	48	96	76	68
6. Gives information	62	82	56	88
7. Asks information	72	72	69	70
8. Asks opinion	50	94	68	76
9. Asks suggestion	70	74	76	68
10. Disagrees	54	90	63	81
11. Shows tension	74	70	70	74
12. Shows antagonism	61	83	82	62

NOTE: A low score indicates high rank, hence, higher frequencies per unit of time
Critical value of U (n_1 = 12, n_2 =12), two-tailed test $p < .05$ ** $p < .01$

subordinates. The interpersonal behavior (IPA) of black and white subordinates did not significantly vary when supervised by blacks.

Differences Between Heterogeneous and Homogeneous Dyads

A comparison of the differences between heterogeneous and homogeneous dyads was also made. However, since the subordinates in the homogeneous dyads were not the same as the subordinates in the heterogeneous dyads, the comparison was limited. A contrast test was made to determine if the differences between black and white subordinates in the heterogeneous dyads were the same as the differences between black and white subordinates in the two homogeneous dyads. This contrast test was made for self-esteem, duration of speech, satisfaction with fellow subordinate, and satisfaction with work. Table 14 reports no significant differences between subordinates in heterogeneous and homogeneous dyads.

TABLE 14

Mean Differences and Test Statistics Values Between Black and White Subordinates in Homogeneous and Heterogeneous Dyads in Measures of Self-esteem, Duration of Speech, Satisfaction with Fellow Subordinate, and Satisfaction with Work

	DYADS		
	Homogeneous $(\bar{w} - \bar{b})$	Heterogeneous $(\bar{s})$	Test Statistic
Self-esteem	.09	5.75	1.47
Duration of speech	.49	2.40	1.23
Satisfaction with fellow subordinate	3.50	3.75	.08
Satisfaction with work	.69	3.96	1.54

NOTE: Critical value of test statistic:
T.S. $\geq$ 1.96 = $p < .05$

T.S. computed by Formula

$$\frac{\bar{s} - (\bar{w} - \bar{b})}{\sqrt{\frac{\sigma^2}{\frac{1}{24}} + \frac{\sigma^2}{\frac{2}{96}} + \frac{\sigma^2}{3}}} = \text{T.S.}$$

Chapter III

Notes

[1]The adjustment for time was necessary because of unequal time spent performing the three tasks by the different groups.

[2]The Mann-Whitney U test was chosen as the primary statistical test because this study employs two or more independent samples with measures that fit an ordinal scale. Siegel (1956) compares its power efficiency to that of 95 percent of the T-test even for moderate-sized samples.

[3]Although parametric tests are traditionally used to test for differences in measures of duration of speech, self-esteem, satisfaction, productivity, and cohesiveness, the Mann-Whitney U test was used throughout the study because many of the populations were neither equal in variance nor normally distributed. However, parametric F tests were used to compare parametric results with nonparametric results. Few differences were noted.

[4]Duncan (1955) recommends this procedure as protection against finding wrong differences in multiple tests. This is thought to be a conservative measure.

[5]The interjudge reliability of the judges' ratings was compared with the Kendall coefficient of concordance. The resulting Kendall W = .292 was tested for significance. We can conclude with considerable assurance ($p < .001$) that the agreement among the thirteen judges is higher than it would be by chance.

[6]Champion (1970) states this procedure is necessary in order to further identify where the difference lies.

CHAPTER IV

SUMMARY, CONCLUSIONS, DISCUSSION, AND IMPLICATIONS FOR FUTURE RESEARCH

This chapter is divided into four parts. Part one presents a summary of the study design. Part two presents conclusions of the test results of the null hypotheses. Part three discusses possible reasons for the results in conjunction with some directional hypotheses suggested by research evidence, hunches, and stereotyped assumptions. Part four presents implications for future research.

Summary

The purpose of this study was to investigate in a simulated job setting differences in attitudes and interaction behavior between (a) black and white supervisors, (b) black and white subordinates, (c) black, white, and racially mixed dyads of subordinates, and (d) black and white supervised dyads of black, white, and racially mixed subordinates.

The specific null hypotheses tested were:

1. There are no differences between black and white supervisors in measures of: (a) interpersonal behavior (IPA), (b) style of leadership, (c) duration of speech, (d) self-esteem, (e) satisfaction with subordinates, and (f) satisfaction with work in the tasks.

2. There are no differences between black and white subordinates in measures of: (a) interpersonal behavior (IPA), (b) duration of speech, (c) self-esteem, (d) satisfaction with fellow subordinate, (e) satisfaction with their supervisor, and (f) satisfaction with work in the tasks.

3. There are no differences between dyads composed of black, white, and racially mixed subordinates in measures of: (a) interpersonal behavior (IPA), (b) productivity of the three tasks, (c) cohesiveness, (d) self-esteem, (e) duration of speech, (f) satisfaction with fellow subordinates, (g) satisfaction with their supervisor, and (h) satisfaction with work in the tasks.

4. There are no differences between black and white supervised dyads composed of black, white, and racially mixed subordinates in measures of: (a) productivity of the three tasks, (b) cohesiveness, (c) duration of speech, (d) satisfaction with their supervisors, and (e) satisfaction with work in the tasks.

A sample of 96 male undergraduate students, 48 black and 48 white, were hired for the study. Each of the 12 black and 12 white older students selected to be supervisors was randomly assigned to supervise three different racially mixed dyads of subordinates (one all-black, one all-white, and one with a black and a white subordinate.) The remaining 72 students, 36 black and 36 white, was randomly assigned to 1 of the 3 subordinate dyads that participated once with a black supervisor and once with a white supervisor. All possible orders of supervisor and dyad combinations was represented twice to reduce the effect of order bias.

Leader position of the supervisors and compatibility of the supervisor and the subordinates in the dyads was established by verbal instructions of the investigator.

Each group of a supervisor and a subordinate dyad was given

three similar problem solving tasks, two structured and one unstructured. After performing the last of the three tasks, both supervisor and subordinates completed satisfaction rating forms (JDI) of each other and work in the tasks. At the end of their group session, each supervisor and subordinate completed a self-esteem form.

During the task performance, two trained graduate students (one black and one white) observed and coded the group interaction by Bales' IPA through a one-way mirror. Other output measures recorded by the investigator were: (1) the duration of speech for each group member, (2) productivity of the three tasks, and (3) cohesiveness.

Conclusions

The results of the null hypotheses tested in this study are summarized in Table 15 and discussed below.

Differences between supervisors.-As compared to white supervisors, black supervisors exhibited:

a) Less asking for opinion
b) Less asking for suggestion

No significant differences were found in other IPA categories, style of leadership, duration of speech, self-esteem, and satisfaction with subordinates and work.

Difference between subordinates.-As compared to white subordinates, black subordinates exhibited:

TABLE 15

Summary of Null Hypotheses Results*

Hypotheses Number	Hypotheses	Rejected or Accepted	P	Table No.
	SUPERVISOR			
1a	IPA	Rejected		3
		W >B #8	.05	
		W >B #9	.05	
1b	Style of leadership	Accepted		4
1c	Duration of speech	Accepted		5
1d	Self-esteem	Accepted		5
1e	Satisfaction with subordinates	Accepted		5
1f	Satisfaction with work	Accepted		5
	SUBORDINATES			
2a	IPA	Rejected		3
		W >B #4	.01	
		W >B #6	.001	
2b	Duration of speech	Accepted		5
2c	Self-esteem	Rejected		5
		B >W	.05	
2d	Satisfaction with fellow sub. (if fellow subordinate is white)	Rejected		5
		B > W	.01	
	(if fellow subordinate is black)	Accepted		5
2e	Satisfaction with supervisor	Accepted		5
2f	Satisfaction with work	Accepted		5
	SUBORDINATE DYADS			
3a	IPA	Accepted		6
3b	Productivity of tasks	Accepted		7
3c	Cohesiveness	Accepted		7
3d	Self-esteem	Accepted		7
3e	Duration of speech	Accepted		7
3f	Satisfaction with fellow subord.	Accepted		7
3g	Satisfaction with supervisor	Accepted		7
3h	Satisfaction with work	Accepted		7
	SUPERVISED DYADS			
4a	Productivity	Accepted		8
4b	Cohesiveness	Rejected		9
	(W dyad with W Supv. > B dyad with W Supv.)		.05	
4c	Duration of speech	Accepted		8
4d	Satisfaction with supervisor	Accepted		8
4e	Satisfaction with work	Accepted		8

*All hypotheses were tested at the .05 level or beyond.

a) Less giving of suggestions
b) Less giving of information
c) Higher self-esteem
d) Greater satisfaction with white fellow subordinate.

No significant differences were found in other IPA categories, duration of speech, and satisfaction with fellow black subordinate, supervisor, and work.

Differences between subordinate dyads.-No significant differences were found in group measures of interpersonal behavior (IPA), productivity of the three tasks, cohesiveness, self-esteem, duration of speech, satisfaction with fellow subordinate, supervisor, and work between black, white, and racially mixed dyads of subordinates.

Differences between supervised dyads.-As compared to white dyads supervised by white supervisors, black dyads supervised by white supervisors exhibited less cohesiveness. No significant differences were found in group measures of productivity, duration of speech, and satisfaction with supervisor and work between the six different supervised dyads.

Supplementary Findings

Table 16 summarizes additional conclusions that were reached from testing differences between black and white subordinates in heterogeneous dyads.

Differences between subordinates in heterogeneous dyads.-As compared to white subordinates in the heterogeneous dyads, black

TABLE 16

Summary of Supplementary Findings

Measures	Differences	P
Between Subordinates in Heterogeneous Dyads		
IPA		
Category #8	Blacks lower than whites	.001
Category #9	Blacks lower than whites	.01
Duration of speech	Blacks lower than whites	.05
Self-esteem	Blacks higher than whites	.05
Satisfaction with fellow subordinate	No difference	
Satisfaction with supervisor	No difference	
Satisfaction with work	Blacks higher than whites	.05
IPA with black supervisor	No difference	
IPA with white supervisor		
Category #4	Blacks lower than whites	.01
Contrast of Homogeneous Dyads with Heterogeneous Dyads		
Self-esteem	No difference	
Duration of speech	No difference	
Satisfaction with work	No difference	
Satisfaction with fellow subordinate	No difference	

subordinates exhibited:

a) Less giving of suggestions
b) Less giving of information
c) Less giving of suggestions when with a white supervisor
d) Higher self-esteem
e) Less duration of speech
f) Greater satisfaction with work in the tasks.

No significant differences were found in other IPA categories, satisfaction with fellow subordinate, or with supervisor between black and white subordinates in heterogeneous dyads.

Differences between heterogeneous and homogeneous dyads.-When comparing differences between subordinates in the homogeneous dyads with differences between subordinates in the heterogeneous dyads, no significant differences were found in individual measures of self-esteem, duration of speech, and satisfaction with fellow subordinates and work (See Table 16.)

Discussion

In considering the results of this study, it is important to compare them with some directional hypotheses suggested by other research evidence, hunches, and stereotyped assumptions. This comparison may be more meaningful in a framework that focuses on group composition beginning at the lowest to the highest level of group structure within the various groups in this study. Within the following framework we can examine the effect of composition on individual and group attitudes and behavior:

a) subordinates in heterogeneous dyads

b) subordinate dyads
c) subordinates
d) supervisors, and
e) the supervised dyads.

Differences between subordinates in heterogeneous dyads.-The major differences between blacks and whites found in this study appear to have originated in the interactions of heterogeneous dyads. The differences outlined in Table 16 also appear to be interdependent.

A number of studies, Katz & Benjamin, 1960; Katz & Cohen, 1962; Katz et al., 1958; Katz & Greenbaum, 1963; and Lefcourt & Ladwig, 1965, indicated that blacks tend to feel inadequate and low in self-esteem compared to whites. However, a recent study by Douglas (1969) of black and white junior high school students presents evidence that black youths express greater self-esteem than whites - particularly in the school self-esteem of the Coopersmith Inventory. Although the findings of this study appear to agree with the findings of Douglas, it is important to note that the difference in self-esteem between black and white subordinates was a function of an increase for blacks and a corresponding decrease for whites compared to subordinates in homogeneous dyads. The apparent change in self-esteem for both blacks and whites may have been associated with the balanced heterogeneity. Blacks were in equal number as well as equal status with whites. Both black and white students may recognize that equal or balanced heterogeneity and an equal status

contact in a predominately white university is unusual. The balanced heterogeneity with equal status may have caused the blacks to feel less threatened and more satisfied and the whites to feel more threatened and less satisfied. This possibility is supported by the greater satisfaction with work expressed by the black subordinates in the heterogeneous dyads. If this is true, and conversations with black participants after the study suggest it is, a balanced heterogeneity and an equal status contact situation may be one of the better ways to gain the satisfaction and cooperation of blacks. The opportunity for an equal status contact may have caused a high sense of self-esteem because the reference group for the black student appeared to be persons from a lower social class (See Figure 1.) Few of his black peers from his described social class would be expected to attend college -- particularly, the University of Florida. Long et al. (1966) also found a similar anomaly among Indian school children. Children from the lowest caste reported higher self-esteem because few children from that caste attended school. Long et al. (1966) reasoned that the lowest caste child percieved higher status within his frame of reference. In Ziller's construct of self-esteem, the field of comparison becomes crucial.

In addition, the white student who attends the university as a matter of course could find the intergroup equal status contact with a black student in a heterogeneous dyad incongruent and demeaning, thus, lowering his self-esteem compared to his reference

group of other white persons. Because the white subordinate may have felt a reduced self-image, he may have reacted in a way that would permit him to gain control of the situation. This possibility is supportted by his increased duration of speech (see Table 11). This significant difference in speaking appears to be in the form of the cooperative leadership acts of giving more suggestions and information. Richards & Cuffee (1971) and Jaffee & Whitacre (1970) found these IPA categories and higher duration of speech to be positively related to leadership roles.

From the above list of differences between black and white subordinates in heterogeneous dyads, we can begin to recognize the effect of group composition on individual behavior.

Differences between subordinate dyads.-Table 15 presents a summary that indicates no differences were found in group and combined individual behaviors of interpersonal behavior, productivity, cohesiveness, self-esteem, duration of speech, and satisfaction with fellow subordinate, supervisor, and work between black, white, and mixed dyads of subordinates. The reasons for the above and other lack of differences in this study are not at all clear. At least five possibilities present themselves: (1) There, indeed, may be no differences between the subordinate dyads. (2) Differences in attitude and behavior did not appear because the study time for groups was too short. (3) The differences that may normally occur between heterogeneous and homogeneous dyads did not appear because of an exceptionally powerful compatibility treatment. (4) Differences occurred, but faulty

instruments prevented their detection. (5) The individual differences that did occur cancelled out in the combining of the dyadic scores and were not dysfunctional for group behavior. Of these possibilities, only the last one could be supported by available data.

Differences between subordinates.-The differences reported in the aggregate comparison between black and white subordinates must be interpreted in light of the differences found between black and white subordinates in heterogeneous dyads and the lack of differences found between subordinate dyads. The differences reported in the heterogeneous dyad of self-esteem and IPA categories of giving more information and suggestion were potent enough ($p < .01$, .001 and .01 respectively) to be manifested in the aggregate comparison. However, the other differences of duration of speech and satisfaction with work were not strong enough ($p < .05$) to affect the aggregate.

The only other aggregate difference reported was that blacks expressed more satisfaction with their fellow white subordinate than whites (see Table 15). Although Table 11 shows that the satisfaction with fellow subordinate score of black subordinates tended to be higher than whites at all comparison levels, it was not significant except in the comparison of white subordinates. Further analysis of the difference revealed that black subordinates were more satisfied with their fellow white subordinate (heterogeneous dyads) than were white subordinates (homogeneous dyads). From this we can again conclude that most of the subordinate differences originated in the heterogeneous dyads.

Differences between supervisors.-The few differences found between black and white supervisors in this study were contrary to some research evidence and a few predictive hunches.

Richards (1970) found that black supervisors gave fewer suggestions than white supervisors. However, in this study the blacks supervised only whites in a business game. In addition, the unfamiliar situational setting of supervising whites only in a business game may have caused blacks to be reluctant to make suggestions. In contrast, the present investigation emphasized equal status and training for supervisors. It may be that this produced an equal status contact that provided the black supervisor with a sense of confidence that was expressed by an equally high self-esteem and a reduced need for opinion and suggestions than white supervisors as presented in Table 15.

Another possible explanation for this racial difference in interpersonal behavior could be that the white supervisors were especially perceptive of the race variable and the leadership techniques that tend to increase group participation. Because of a university administrative confrontation with a small minority of black students the previous year in which many of the white students were sympathetic to the black cause, the white supervisors may have deliberately tried to involve the black subordinates in the tasks.[1]

Another explanation for the lack of differences between black and white supervisors is the small sample of black and white supervisors participating. Although 72 supervisory situations were compared, only 24 different students - 12 black and 12 white - participated. Caution

must be exercised in generalizing from a sample of 12 black and 12 white college students who role-played the supervisory positions.

Differences between supervised dyads.-Contrary to several hunches and directional hypotheses suggested by King & Bass (1970), Ferman et al. (1968) and Kochman (1969), the composition of these six different supervisor-subordinate groups did not appear to affect group behavior as measured. Only the cohesive difference between white and black dyads supervised by white supervisors appears to fit the hypotheses of King & Bass (1970). They contend that all groups of one race should be more cohesive. Nevertheless, Speroff & Kerr (1952) and Hoffman & Maier (1961) assert that we should also expect less cohesiveness and lower productivity from groups with heterogeneous dyads. Perhaps the tendency for higher satisfaction with fellow subordinates by both black and white subordinates shown in Table 11 may explain the lack of cohesiveness difference. This explanation receives some support from Guttentag (1970) who found that cohesiveness increases when members feel attracted to one another.

However, this does not explain why black dyads did not appear higher in cohesion. Ferman et al. (1968) found that blacks appear to be high on affiliation which should result in greater cohesion and satisfaction scores. The discussion about the subordinates in the heterogeneous dyads raises some question about any study that does not recognize that blacks are no more homogeneous than whites.

The conclusion that the racial composition of these groups did not significantly affect group productivity on the three tasks finds some

support from the Belgian Navy study of Fiedler (1966) with French-speaking and Dutch-speaking men. He found "strikingly small" differences in performance between homogeneous and heterogeneous groups. Fiedler, Meuwese & Oonk (1961) also found no difference in Dutch groups differing in religious and subcultural homogeneity. If we can equate language and religious differences with racial differences, we may begin to question the effect of racial composition on some aspects of group behavior.

Another possible explanation was suggested by Ziller (1972). His paradigm calls for future research in the relationship between group composition (heterogeneity or homogeneity) and group productivity to consider the intervening variables of affective group structure, group processes, and group perception. According to Ziller (1972), these intervening variables can be defined with variables already measured in this study (i.e., affective group structure - cohesiveness, group processes - amount of conflict expressed, and group perception - individual differences). An analysis of the lack of differences found in the intervening variables in terms of our study helps us to understand why the group composition (heterogeneity or homogeneity) did not adversely affect group productivity. For example, cohesiveness (affective group structure) differed only between two groups; amount of conflict expressed (group processes) did not differ between supervisor or dyads from IPA observations (Tables 2 and 7); and individual differences (group perception) differed only in the heterogeneous dyad. From this we might be able to conclude that racial composition did not

appear to adversely affect group productivity.

The lack of difference in leadership style is contrary to two hypotheses by King & Bass (1970). They hypothesized that black supervisors would exercise more nondirective leadership with white subordinates than white supervisors because blacks would want to minimize their leadership position and the status incongruity of their subordinates by an open and participative leadership style. King & Bass (1970) also theorized that white supervisors exercised more directive leadership with black subordinates than black supervisors because racist attitudes - conscious or unconscious - would legitimatize a directive style.

The reasons that leadership style differences were not found in this study (see Table 3) might be related to the peer association of the students participating and to the temporary and artificial nature of the supervisor-subordinate relationship. A student might be more reluctant to be directive to a peer rather than a real subordinate. In addition, it appears from Table 2 that both black and white supervisors maintained their style of leadership regardless of racial characteristics of the dyad being supervised. This lack of leadership style difference also may be related to lack of difference in satisfaction with supervisor expressed by their subordinates.

Another directional hypothesis not supported by this study was Kochman's (1969) field study indicating that all-black groups "rapped" more than other groups. A contrast in goal specificity and goal orientation between this study and an industrial study may be able

to explain the absence of differences in "rapping" as measured by duration of speech. In the uncertainty of the industrial world, blacks may have difficulty in understanding from their white supervisors precisely the what, how, and why of the job. It does seem logical that this uncertainty would lead to "rapping with their soul brothers" for information and security. However, this study emphasized goal clarity and goal specificity - particularly in the repeated session by both supervisors and subordinates.

Limitations and Implications for Future Research

Before discussing the implications it is necessary to point out that the generalizability of this study is limited by its use of college students at the University of Florida as the subject population and by its simulation of a supervisor-subordinate relationship in the laboratory. Replication of this study at a non-southern university or in the natural world might produce different results.

Another limitation of the study was the small sample of black and white supervisors participating. Caution must be exercised in generalizing from a sample of twelve black and twelve white students to an entire race of people. In addition, the investigator recognizes that the reported differences between black and white subordinates may have been due to social class differences identified in Figure I.

The understanding of the impact of racial composition on group attitudes and behavior represents a desirable goal in the literature of group dynamics. The data in this dissertation suggest that few of the individual differences between black and white supervisors and subordinates affected group productivity. Most of the reported individual

differences occurred between black and white subordinates in the heterogeneous dyads. Even these differences did not appear to perceptively affect group behavior.

Although there are many important questions which need answering before our knowledge of the impact of racial composition on groups is adequate, some of the more pressing ones are: Will a replication of this study yield similar results? Will a field study under hierarchically determined supervisor-subordinate relationships yield similar results? Would the assignment of the same participants to both homogeneous and heterogeneous groups produce different results? Is the compatibility treatment responsible for the lack of differences in group behavior? If so, can compatibility treatments be helpful to industry in structuring group behavior? What is the significance of the balanced heterogeneity in an equal status contact between blacks and whites? Would an unbalanced heterogeneity produce different results on individual and group behavior?

Chapter IV

Notes

[1]During the month of the study, a black male became the first elected black president of the student body in this predominantly white university.

APPENDICES

APPENDIX A

BIOGRAPHICAL QUESTIONNAIRE

Biographical Information Instructions

Please complete this questionnaire if you are interested in participating in this study. This information will be used in scheduling you for your group assignment and in mailing your check to you. These questions are meant to tell us more about you as an individual. The information you give us will be strictly confidential. No one but the researchers will see it.

Thank you.

BIOGRAPHICAL QUESTIONNAIRE

Part I

INSTRUCTIONS: It will help us in matching you with others in the study to know something about your background. Please answer the following questions.

NAME_____ AGE_____

ADDRESS_____ TELEPHONE_____
(for mailing of check)

SOCIAL SECURITY NUMBER_____

Please indicate your marital status by checking ( ) one of the following categories.

Married?_____ Divorced_____

Single?_____ Separated?_____

How many dependents do you have?__(exclude yourself)_____

Where were you born?_____
city state

Where did you live during the time you were growing up? Please check one.

_____farm community _____medium-sized or large city

_____small town _____hard to say - we moved often

When you were growing up, was your family's income: (Please check one.)

_____higher than average for the country?

_____about average for the country?

_____less than average for the country?

_____very much below average for the country?

_____so low we were mostly on welfare?

Whom did you live with most of the time while you were growing up? (Please check one.)

_____your mother and father

_____your mother only

_____your father only

_____others (please specify relationship to you, if any)

_____

How many brothers and sisters do you have?_____

You have seen in the paper stories about social class differences. In which of these classes do you think you really belong? (Please check one.)

_____upper class

_____middle class

_____working class

_____poverty class

What was your father's occupation or major job duty? (Please check one.)

_____unskilled

_____semi-skilled

_____skilled

_____clerical or white collar

_____professional

Part II

INSTRUCTIONS: Now, please tell us about how you feel about some things. (Answer by checking how much you like each item.)

	LIKE VERY MUCH	LIKE	NEITHER LIKE NOR DON'T LIKE	DON'T LIKE	VERY MUCH
The academic life at UF	___	___	___	___	___
What you do in your spare time	___	___	___	___	___
Your family life	___	___	___	___	___
Friends at school	___	___	___	___	___
Taking part in social activities	___	___	___	___	___
The way other students treat you	___	___	___	___	___
Your life in general	___	___	___	___	___
A life in the Navy (for others)	___	___	___	___	___

APPENDIX B

SHIP ROUTING INFORMATION

SHIP ROUTING INFORMATION

The distance from A to B is 200 miles. (direct route)

The distance from A to C is 50 miles. (direct route)

The distance from A to D is 200 miles. (direct route)

The distance from B to C is 150 miles. (direct route)

The distance from B to E is 100 miles. (direct route)

The distance from C to D is 200 miles. (direct route)

The distance from D to E is 50 miles. (direct route)

There is no direct route between A and E, B and D, or C and E.

Solution
ACBED 350

APPENDIX C

KNOT TYING INSTRUCTIONS

KNOT TYING INSTRUCTIONS

Working in Hemp and Manila--Knots. This instruction shows a number of simple knots, all of which are made with the end of a single rope. (The word "line" is properly used in the Navy instead of "rope".)

French Bowline (Figure 1). When sending a man over the side on hazardous work, into a smoke-filled hold, or anywhere where he may have to use both hands, make use of the French bowline. The bowline is formed in the same fashion as the regular bowline, except that the end (D), instead of going about the standing part (E) at once, is given a round turn about the loop of the eye (A), and then the knot is finished off as before. This leaves two eyes that are loosely connected through the loop neck. The eyes are made so that a man can sit in one--(b)--while the other--(c)--goes under his armpits, the knot being at his breast. The weight of the man hauls the armpit eye taut, he is safe against falling out and is held upright if unconscious. Never use manila if there is a chance of it catching fire.

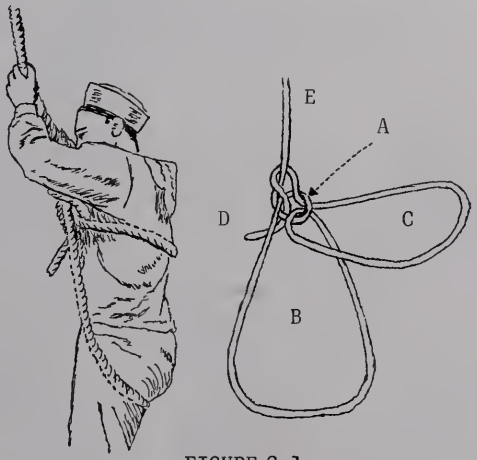


FIGURE C-1

Bends (Figure 2). This picture shows a series of knots for joining the ends of the two ropes or the two ends of the same rope. This is perhaps the most important group of knots with which we have to deal.

Sheet or Becket Bend, single. C. Used in bending on flags not fitted with snap hooks and very efficient for the purpose of uniting two ends of a rope or a rope's end to an eye. Made by passing the end of a rope up through the bight (eye) of another, around both parts and under its own part.

Sheet Bend, double. D. Here the end of the bending line is passed twice around the standing line and through its own part, giving added security.

(C)
SHEET OR BECKET
BEND SINGLE

(D)
SHEET OR BECKET
BEND DOUBLE

FIGURE C-2

APPENDIX D1

JOB DESCRIPTION INDEX

SUPERVISOR

JOB DESCRIPTION INDEX

Group Number_____

Supervisor Number_____

QUESTIONNAIRE ABOUT SUPERVISOR

Subordinate Number_____

Think of the kind of supervision that you have just had on the group tasks. How well does each of the following words describe your most recent supervisor (the person who acted as supervisor on the task just completed?) Circle Y for 'YES' if it describes the supervision you have recently received, N for 'NO' if it does NOT describe it, or ? if you cannot decide.

SUPERVISION ON PRESENT JOB

	YES	?	NO
asks my advice	Y	?	N
hard to please	Y	?	N
impolite	Y	?	N
praises good work	Y	?	N
tactful	Y	?	N
doesn't supervise enough	Y	?	N
quick tempered	Y	?	N
tells me where I stand	Y	?	N
annoying	Y	?	N
stubborn	Y	?	N
knows job well	Y	?	N
bad	Y	?	N
intelligent	Y	?	N
leaves me on my own	Y	?	N
lazy	Y	?	N

Do you have any comments about this person?_____

_____

_____

Thank you for your cooperation.

Group Number_____

Supervisor Number_____

Subordinate Number_____

Think about the work you have just done. What was it like most of the time? How well does each of the following words describe your work? Circle Y for 'YES' if it describes your work, N for 'NO' if it does NOT describe it, or ? if you cannot decide.

WORK IN THIS STUDY

	YES	?	NO
fascinating	Y	?	N
routine	Y	?	N
satisfying	Y	?	N
boring	Y	?	N
good	Y	?	N
creative	Y	?	N
respected	Y	?	N
pleasant	Y	?	N
useful	Y	?	N
tiresome	Y	?	N
challenging	Y	?	N
frustrating	Y	?	N
simple	Y	?	N
gives sense of accomplishment	Y	?	N

Do you have any comments on the study?_____

_____

_____

_____

Thank you for your cooperation.

Subordinate Number_____ Group Number_____

Supervisor No._____

QUESTIONNAIRE ABOUT FELLOW SUBORDINATE AND THE JOB

Think of the person who has just been your fellow subordinate (fellow worker) in your group. He was the person who worked with you under the different supervisors. How well does each of the following words describe your fellow worker (subordinate)? Circle Y for 'YES' if it describes the person worked with, N for 'NO' if it does NOT describe him, or ? if you cannot decide.

PERSON YOU WORKED WITH

	YES	?	NO
stimulating	Y	?	N
boring	Y	?	N
slow	Y	?	N
ambitious	Y	?	N
stupid	Y	?	N
responsible	Y	?	N
fast	Y	?	N
intelligent	Y	?	N
easy to make enemies	Y	?	N
talks too much	Y	?	N
smart	Y	?	N
lazy	Y	?	N
unpleasant	Y	?	N
active	Y	?	N
loyal	Y	?	N
hard to meet	Y	?	N

Do you have any comments about this person?_____

_____

_____

Thank you for your cooperation.

APPENDIX D2

JOB DESCRIPTION INDEX

SUBORDINATE

Group Number_____

Supervisor No._____

Think about the work you have just done. What was it like most of the time? How well does each of the following words describe your work on your present job? Circle Y for 'YES' if it describes your work, N for 'NO' if it does NOT describe it, or ? if you cannot decide.

WORK IN THIS STUDY

	YES	?	NO
fascinating	Y	?	N
routine	Y	?	N
satisfying	Y	?	N
boring	Y	?	N
good	Y	?	N
creative	Y	?	N
respected	Y	?	N
pleasant	Y	?	N
useful	Y	?	N
tiresome	Y	?	N
challenging	Y	?	N
frustrating	Y	?	N
simple	Y	?	N
gives sense of accomplishment	Y	?	N

Do you have any comments on this study?_____

_____

_____

_____

Thank you for your cooperation.

Subordinate Number_____ Group Number_____

Supervisor No._____

QUESTIONNAIRE ABOUT SUBORDINATES

You have just finished supervising two (2) people in the performance of 3 different tasks. We would like you to describe each of these people. First, think of the person on your left. Consider the way he behaved on all the tasks. How well does each of the following words describe this person? Circle Y for 'YES' if it describes him, N for 'NO' if it does NOT describe him, or ? if you cannot decide.

PERSON ON YOUR PRESENT JOB

	YES	?	NO
stimulating	Y	?	N
boring	Y	?	N
slow	Y	?	N
ambitious	Y	?	N
stupid	Y	?	N
responsible	Y	?	N
fast	Y	?	N
intelligent	Y	?	N
easy to make enemies	Y	?	N
talks too much	Y	?	N
smart	Y	?	N
lazy	Y	?	N
unpleasant	Y	?	N
active	Y	?	N
loyal	Y	?	N
hard to meet	Y	?	N

Do you have any comments about this person?_____

_____

_____

Thank you for your cooperation.

Group Number_____

Supervisor No._____

Subordinate No._____

Now, think of the person on your right. Consider the way he behaved on all the tasks. How well does each of the following words describe this person? Circle Y for 'YES' if it describes him, N for 'NO' if it does NOT describe him, or ? if you cannot decide.

PERSON ON YOUR PRESENT JOB

	YES	?	NO
stimulating	Y	?	N
boring	Y	?	N
slow	Y	?	N
ambitious	Y	?	N
stupid	Y	?	N
responsible	Y	?	N
fast	Y	?	N
intelligent	Y	?	N
easy to make enemies	Y	?	N
talks too much	Y	?	N
smart	Y	?	N
lazy	Y	?	N
unpleasant	Y	?	N
active	Y	?	N
loyal	Y	?	N
hard to meet	Y	?	N

Do you have any comments about this person?_____

_____

_____

_____

Thank you for your cooperation.

APPENDIX E

SOCIAL ORIENTATION TASKS

SOCIAL ORIENTATION TASKS

The questions which follow are designed to provide an indication of the way you look at yourself and significant other people. In this description of yourself and others, words are avoided. This is a social psychological instrument designed for research purposes only. Hopefully, it will tell us something about differences among people in their perceptions of self and others.

This instrument has been approved by the Department of Health, Education and Welfare, Office of Education.

Please work as quickly as possible. It should require little more than five minutes.

The circles below stand for people. Mark each circle with the letter standing for one of the people in the list. Do this in any way you like, but use each person only once and do not omit anyone.

T - a teacher

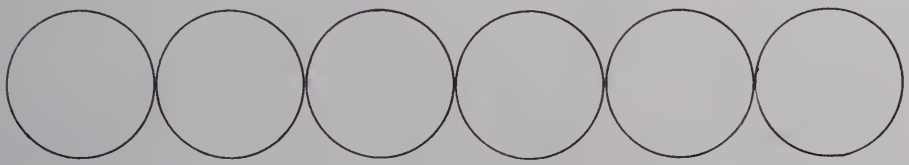
Y - Yourself

B - a beautiful person

M - Mother

S - someone you feel sorry for

C - a cheerful person



The circles below stand for people. Mark each circle with the letter standing for one of the people in the list. Do this in any way you like, but use each only once and do not omit anyone.

F - Father

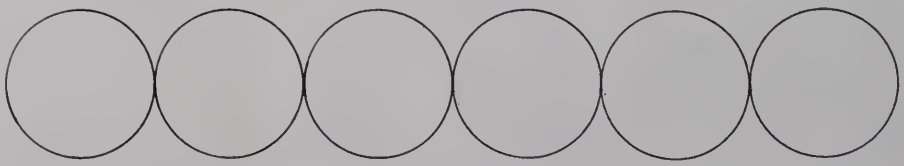
B - you best friend

D - Doctor

Y - Yourself

K - a kind person

M - someone who makes mistakes



The circles below stand for people. Mark each circle with the letter standing for one of the people in the list. Do this in any way you like, but use each person only once and do not omit anyone.

U - someone who is not kind

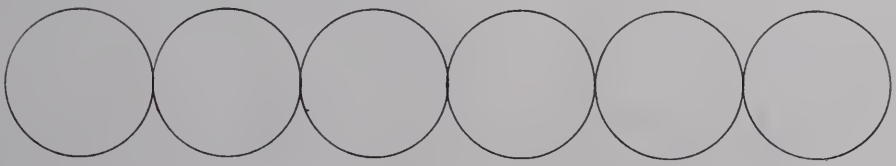
P - a polite person

S - the strongest person you know

H - the happiest person you know

N - a neighbor

Y - Yourself



The circles below stand for people. Mark each circle with the letter standing for one of the people in the list. Do this in any way you like, but use each person only once and do not omit anyone.

F - a friend

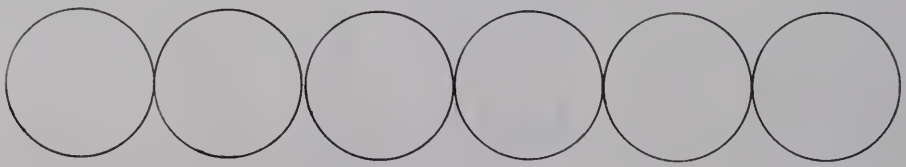
S - a selfish person

Y - Yourself

G - Grandmother

L - someone you hope to be like

D - a dean of students



The circles below stand for people. Mark each circle with the letter standing for one of the people in the list. Do this in any way you like, but use each person only once and do not omit anyone.

Y - Yourself

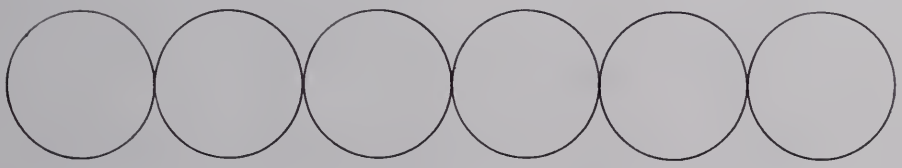
S - your sister or someone who is most like a sister

F - a fireman

C - a cruel person

W - someone who has learned a lot

L - a lucky person



The circles below stand for people. Mark each circle with the letter standing for one of the people in the list. Do this in any way you like, but use each person only once and do not omit anyone.

A - a good athlete

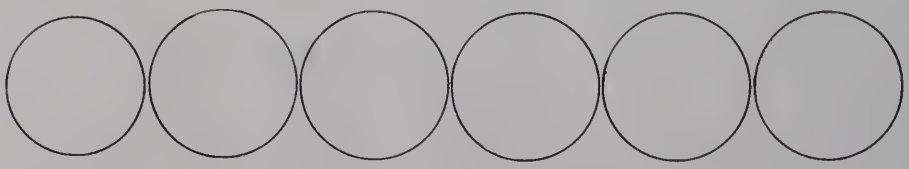
N - a nurse

P - a sad person

S - a student

Y - Yourself

B - a brother or someone who is most like a brother



APPENDIX F

LETTER RATING FORM

LETTER RATING FORM

Rater Number_____ LETTER #_____

I

FORM

This dimension relates to your opinion of an appropriate handwritten recruiting letter in terms of a pleasing appearance. If the letter is full of grammatical errors, strikeouts, and scribbles that create an unfavorable appearance and impression, it should be rated low or at the sloppy end of the scale. A neat and orderly appearance with correct word usage and grammer should be rated high or at the neat end of the scale.

sloppy____: ____: ____: ____: ____: ____: ____: ____: neat

II

UNDERSTANDABLE

This dimension relates to your opinion of whether the letter makes sense. There should be no doubt as to the meaning of each sentence, phrase, and paragraph. Lowest on this scale should be any letter that needs to be read several times before the reader can get any meaning from it. Clear, precise, and meaningful letters should be rated at the highest end of the scale.

least understandable____: ____: ____: ____: ____: ____: ____: most understandable

III

ORIGINALITY

Consider here the degree to which the letter is new in its approach to recruiting. Letters that are unique, unusual, or off-beat in showing original approaches should get a high score or a rating near the original end of the scale -- the more so the closer. The more the letter seems to express old and commonplace ideas, the more the rating should be toward the left or lower end of the scale.

commonplace____: ____: ____: ____: ____: ____: ____: original

IV

PERSUASIVENESS

This dimension reflects the degree to which the letter gives you a feeling that Navy life is a desirable and interesting opportunity for college students. If the letter makes you want to inquire into what the Navy has to offer, it should receive the highest or convincing rating. The letter should be given the lowest or unconvincing rating if it would discourage you or others from joining the Navy. The greater the influence, the more the rating should be on the higher or convincing end of the scale.

unconvincing____: ____: ____: ____: ____: ____: ____: convincing

V

Assume you were undecided about joining the Navy (that is, there were only 5 chances out of 10 that you might join). After reading this letter, what would be your new feeling about joining the Navy?

Chances out of 10

____: ____: ____: ____: ____: ____: ____: ____: ____: ____: ____:
0 1 2 3 4 5 6 7 8 9 10

APPENDIX G

INTRODUCTION AND INSTRUCTIONS FOR TASKS

INTRODUCTION AND INSTRUCTIONS FOR TASKS

(After instructing participants where to sit with supervisor in the middle.) Thank you for coming to participate in this study. As you already know, the purpose of this study is the analysis of problem solving effectiveness of groups. In order to analyze the group process, I'll be remaining in the room. In addition, I have some help from two other graduate students who will help observe the group process. However, this room is too small for them to sit in without distracting you, so they will be in the next room behind this one-way mirror (point to mirror). This microphone on the table is to enable them to hear the method you use in solving problems.

I want you to know they are there. We are not trying to hide anyone or anything. Now that you know they are there, you can forget them. They don't know you and you don't know them. You won't bother them and I hope they won't bother you.

There will be others participating in this study - 72 groups in all. In order to give each group an <u>equal chance</u> for doing well, we would like you not to discuss the details of this study with any one of your friends. They also may be participating later on. It is better for all groups to be equally unprepared. After April 30th we should be finished with the group study.

The biographical questionnaire (like the one you filled out the first day you met me) has been successfully used in determining the compatibility of groups in previous research. Your group was selected to be compatible so you should enjoy the exercise and perform it efficiently.

You will perform three tasks under one supervisor and then later you will perform the same tasks again with another supervisor. Please try to do your best in every task. Your supervisor was selected because of his ability and because of his interest in group members and group activity. Now to begin the problem solving.

Instructions

SHIP ROUTING

A ship is scheduled to leave port A with destinations of ports B, C, D & E. There are several routes that might be followed, but the ship's captain wants to pick the shortest route. Of course, he plans to visit each port once and therefore doesn't want to travel the same route twice.

Your job is to find the shortest route in order to visit these ports.

The distance between ports has been randomly distributed among your group. You can solve the problem by working together as a group. No one of you can solve the problem by working alone because no one has all the information needed to solve it. You must, therefore, communicate with each other in order to reach solutions. You may communicate freely verbally among yourselves, but you may not show each other the items of information that you have been given. The object is for the group to learn the answer in the shortest possible time. When you have an answer that you as a group are willing to accept, the supervisor should raise his hand. I will check for the correct solution. If your answer is not correct, you will want to work until you find the correct solution. The sooner you report a solution, the better will be the group's performance score. Are there any questions? Incidentally, I've borrowed a stop watch from Coach Carnes to help me record the time. Are you ready? (Pause for questions.) BEGIN.

Instructions

KNOT TYING

Now we would like you to try a task that requires you to work fast together as a group in a physical job. Your supervisor will demonstrate the method of tying an unusual knot (French bowline or double becket bend.) Follow his instructions well because each of you will be asked to duplicate the knot in the shortest period of time. (We will decide if the knot was completed properly.) While one member is trying to tie the knot, the rest of the group (the leader and the other member) may assist him but with no physical help. Your group score will be the total elapsed time for the training by the supervisor plus the time for each of you other group members to tie the knot successfully. Do you have any questions? (Pause.) BEGIN.

Instructions

RECRUITING LETTER

Many times in our work lives we are asked to do tasks that are very challenging and different. The task you are asked to do now may seem a bit different, but this is a particular challenge.

Since this study is sponsored by ONR, they would like to have an obvious return for their dollars. It may be a challenge since you are asked to use your group creative skills to design a recruiting letter urging college students to join an all-volunteer navy. (Since you are C.S., who knows more about college students?) You can assume that the C.S. will be in the 18-25 bracket. Your supervisor will assist you in this creative effort by recording the group ideas on a note pad. Before the end of 30 minutes, you are expected to have completed this recruiting letter containing

no more than 250 words. Letters will be judged on the style, form, persuasiveness, and originality.

I'll remind you after each 10 minutes of the time remaining. Any questions? (Pause.) BEGIN.

Post-Task Questionnaire

Now that you have completed these three tasks, please take a few minutes to complete these forms. If you have known each other before, please try to make your comments as objectively as possible and related only to the activity here today. (Hand the forms to the supervisor at the table behind him.) Please roll your chair over here. I think you'll be more comfortable.

Return these forms to me as soon as you are finished (then relax for a few minutes and we will begin another session for you with another supervisor).

NOTE: Instructions are repeated for the second trial of the subordinates except for references regarding a second trial. The order of the first two tasks were alternated within each group.

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BIOGRAPHICAL SKETCH

John A. Ruhe was born July 9, 1932, in Chesterton, Indiana. He was educated in St. Patrick's Elementary School and Chesterton High School. He graduated from Valparaiso University in 1954 with a B. A. degree in liberal arts. He then spent the next two years in the U. S. Army - serving most of the time with the Counter Intelligence Corps in Germany. In 1956, he entered graduate school at Indiana University and graduated with an M. B. A. degree in 1958.

In 1958, he was employed in the first of a series of managerial positions with the Procter & Gamble Company, Cincinnati, Ohio. These managerial positions included Wage Cost Control Engineer, Production Foreman, Employment Manager, Manpower Coordinator, Hygiene and Safety Engineer, and Production Supervisor. In 1969, following a six-month special assignment in developing an Awareness Training Program for the Supervising and Training of Disadvantaged Employees, he entered the doctoral program in Business Administration at the University of Florida.

John A. Ruhe is married to the former Frances Castagna. They have two sons and three daughters.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Walter A. Hill, Chairman
Associate Professor of Management

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Ralph H. Blodgett
Professor of Economics

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Marvin E. Shaw
Professor of Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Norman G. Keig
Associate Professor of Economics

This dissertation was submitted to the Department of Management in the College of Business Administration and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August, 1972

A. G. Smith
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